SERVICE

Service Instructions on Allison Machine Typical of Ethyl Chloride Compressors

SERVICING the Allison electric refrigerator, manufactured several years ago by the Domestic Electric Refrigerator Corp. in New York City, presents a number of unusual problems because of the unique construction of its two-stage compressor, yet service instructions are fairly typical of those for ethyl chloride machines.

Ethyl chloride is a low-pressure refrigerant, boiling at 54° F. under atmospheric pressure. Consequently it operates in a vacuum on the low side of a household refrigerator. Temperature of the refrigerant in the evaporator is 12° F., requiring from 18 to 20 in. of vacuum. Pressure maintained in the condenser is from 15 to 20 lbs., depending on the room temperature. temperature of the compressor dome is about 120° F., although it may rise to 140 or 150° F. without danger.

The compressor housing is constructed of pressed steel, the compressor body is of cast iron, rotors are of tool steel, and spacer fins, rotor blades, and wiper blades are of carbonated steel.

Allison Condensing Unit

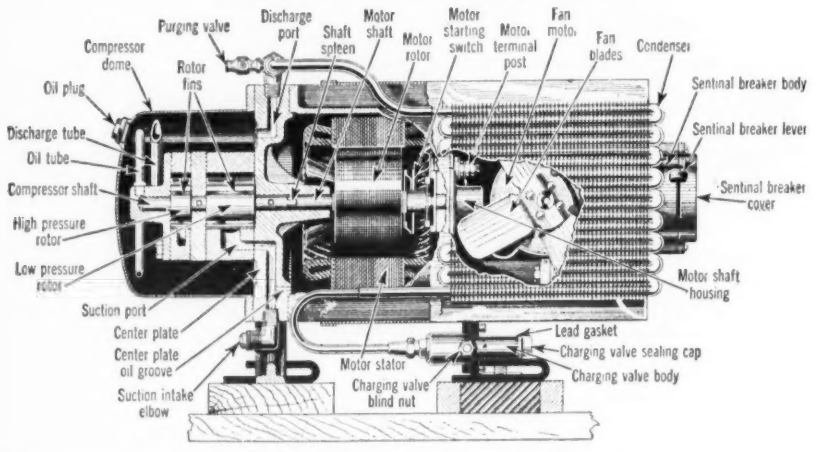


Fig. 1—Cut-away section of the Allison two-stage rotary compressor, showing arrangement of the various component parts.

The compressor is of the rotary type, mounted in a horizontal position as shown in Fig 1. It has two stages of compression, provided by the high-pressure rotor (the smaller one at left in Fig. 1) and the low-pressure rotor (the larger one, at the right). These are fin-type rotors, each rotor being equipped with four blades.

Points of contact between the rotors and the cylinder wall are made by means of what are termed "wiper blades," which fit into rotor blades in such a manner as to insure a rocker action and provide adequate contact of the blade to the cylinder wall.

The ability of these blades to pick up gas from the in port of the compressor, compress the gas, and hold their contact to the cylinder walls depends on the eccentric assembly of rotors in relation to the cylinder wall.

Some assistance is given these blades by a special design of spacer pins which force the blades to actuate upon each revolution of the rotor, although centrifugal force alone presumably is strong enough to maintain sufficient contact.

Gas discharged from the compressor rotors is forced into the compressor housing where separation of the gas and oil takes place. Then the compressed gas enters the condenser coils where heat is removed by forced draft cooling from the fan, and the gas is condensed to a liquid. This operation is made under a condensing pressure of from 15 to 20 lbs. Normal

Lubrication is provided by 1½ qts. of oil charged into the compressor, most of it remaining in the compressor dome and evaporator at all times. It is forced through parts of the compressor to bearings by pressure. This is done through a small opening through the center of the shaft from the outbearing on the compressor, feeding both motor and compressor bearings. A refrigeration oil of the Texas Oil Co. is used.

The refrigeration system is of the flooded type, and designed for circulation of a small amount of oil throughout the systems to lubricate the float valve parts, etc.

Float Valve

The float-type expansion valve is shown in Fig. 2. Body of the valve is 3/32-in. brass, built to withstand 80 lbs. of pressure (although operating pressure is only 15 lbs.). The valve needle is of Monel metal, ground for proper seating in the brass orifice. The float ball is also of brass, and is spherical in shape.

Float Valve

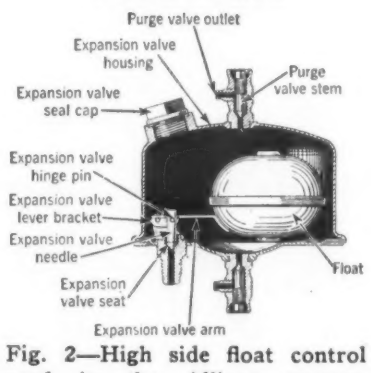


Fig. 2—High side float control used in the Allison system.

The level of liquid ethyl chloride in the float valve chamber dictates opening or closing of the valve to maintain a flooded condition in the evaporator. As the liquid level rises in the body of the valve, the float rises lifting the needle off its orifice seat, and permitting liquid refrigerant to enter the evaporator.

The Allison thermostat was manufactured by the Automatic Reclosing Circuit Breaker Co. in three different adjustments, with 6, 8, and 10 per cent solutions of alcohol and water in the bellows element. This bellows is inserted in a brass tube in which it can expand and contract, one end of the tube being fastened to a make-and-break switch-body. The switch is connected in series with the motor.

By means of a small clamp on the top of the evaporator, the thermostat bulb is clamped to the evaporator,

Low Side

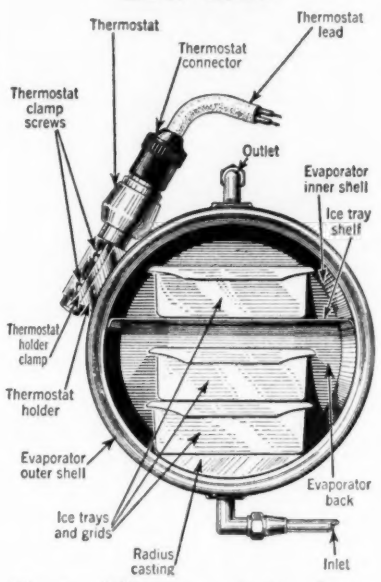


Fig. 3—Allison evaporator showing how this early model of a Ranco control was attached.

see Fig. 3. Temperature changes in the food compartment cause the bellows to expand or contract, actuating the make-and-break switch.

The 5½-cu. ft. Allison refrigerator was provided with an 8 per cent solution of alcohol as standard in the thermostatic element, and the 9 and 10-cu. ft. models had 10 per cent solutions.

The thermostat with a 6 per cent solution of alcohol will not permit as cold a surface on the evaporator as the 8 or 10 per cent thermostats because with a lower percentage of alcohol, the expansion and contraction of the bellows operate more rapidly, opening the switch before the evaporator surface is extremely cold.

Thermostats are removed by loosening screws on the clamps and pulling the assembly out from the top.

Data on Ethyl Chloride Refrigerating Systems

As an aid to service men who are confronted with service problems on "orphan" refrigerators, the News is offering in this and the next issue, service data on the Allison electric refrigerator which used ethyl chloride as a refrigerant.

This week's article contains a description of the Allison machine and drawings of several of its parts. Next week several of the common service operations will be described, by explanations of common service problems and their remedies.

Charging Valve

For charging the Allison system with ethyl chloride, and for attaching the pressure gauge assembly to determine high-side pressure readings, the charging valve (Fig. 4) is used.

The end of the valve accommodates a sealing cap. Behind the cap a lead gasket is inserted to prevent ethyl chloride from escaping in the event the valve does not seat properly.

The ports on inside of valve body are arranged in such a manner that the flow of liquid can pass through only two ports when valve is seated, either all the way in to the right, or all the way out to the left.

For gauge readings the valve is not seated, but in neutral position, and the refrigerant can pass through its regular cycle, and at the same time gauge reading port is open to allow pressure to register on the gauge.

It will be noted by Fig. 4 that when the valve is seated all the way to the right, the condenser coil is shut off.

Charging Valve

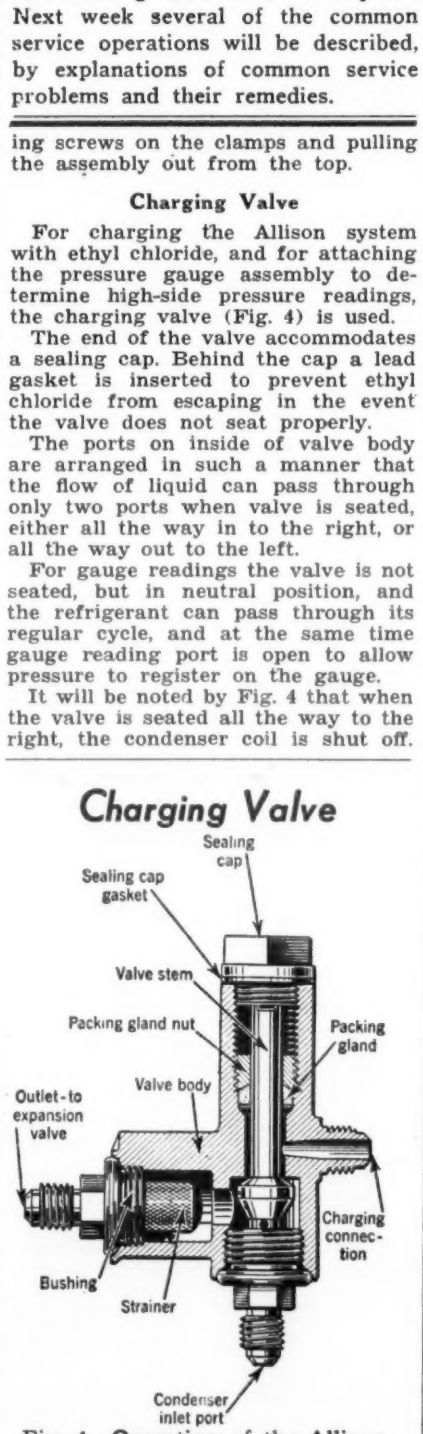


Fig. 4—Operation of the Allison charging valve is explained in the text above.

The charging port and feed line to expansion valve is open. This position of valve is used when adding ethyl chloride to the system.

When valve is closed all the way out (to the left), the charging port is closed and ports to expansion valve and condenser are open. This is the position when machine is in operation.

The motor used on the Allison was a ⅛-hp. split-phase 110-volt a. c. motor. Lubrication is provided by means of a pressure oil feed through the shaft of the compressor and the motor. It is impossible to oil the motor by hand.

The evaporator is of the circular shell type, see Fig. 3. It was built of sheet steel, tinned inside and out.

Circuit Breaker

Allison's "Sentinel" circuit breaker was built by Westinghouse to withstand six amperes. A current larger than this causes the bi-metallic element to expand, tripping a switch in the breaker, and stopping the motor. The switch does not re-make contact automatically, but must be re-set by hand. This is done by pulling the lever (See Fig. 1) all the way up, then pushing the lever all the way down.

The condenser fan in the condensing unit assembly is driven by a 1/35-hp. straight induction motor. It is lubricated by a grease packing cup which should be greased about every two years. The condenser is of the finned radiator type.

Check Valve

The purpose of the Allison check valve is to prevent oil and head pressure from the compressor dome entering evaporator through suction line when machine is idle (between operating periods).

Check Valve

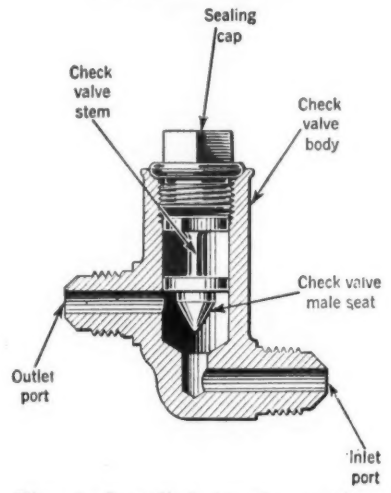


Fig. 5—Installed in the suction line, the check valve is designed for "one-way passage" of the refrigerant.

The valve, as shown in Fig. 5, is designed to permit gas and oil to pass through the valve in one direction only, from evaporator to compressor.

Low Side Strainer

The strainer is located in the return line to prevent foreign matter entering compressor. This strainer is constructed in such a manner as to allow sediment or foreign matter to settle in bottom of strainer housing and not effect stoppage of the screen.

To remove the condensing unit, the following instructions are given in the Allison Service Manual:

(a) Stop machine by removing plug from electric service outlet; remove charging valve cap and turn valve stem all the way in (to the right) until valve seats firmly. Replace charging valve cap.

(b) Remove ⅜-in. tubing (return line) from check valve fitting; (some oil and gas may escape, so place a cloth or some receptacle underneath to catch flow).

(c) Remove ¼-in. tubing (pressure line) from charging valve fitting; (some liquid ethyl chloride may escape, so place a cloth or some receptacle underneath to catch flow).

(d) Shift unit to a convenient position where end cover on sentinel breaker can be removed; disconnect the thermostat cord lead inside sentinel breaker.

(e) Remove rear cover of fan shroud, by loosening three screws holding cover, then loosen nut on motor terminal post and disconnect other thermostat cord lead.

Installing a Condensing Unit

(a) Remove compressor oil cap on compressor dome and determine if dome is full of oil. (Compressor dome should be charged with oil to level of oil plug.) Replace cap, using a *new lead gasket*, and draw up tight.

(b) Place new unit in a convenient position in base of refrigerator; remove fan shroud cover, loosen up nut on motor right hand terminal post, connect one lead of thermostat cord to post, tighten up on nut and replace fan shroud cover.

(c) Remove sentinel breaker cover and connect other thermostat lead, replace cover and set unit in position on rubber pads.

(d) Connect ⅜-in. tubing to check valve fitting; connect ¼-in. tubing to charging valve fitting.

(e) Remove sealing cap from charging valve and be sure the valve stem is turned all the way out (left), replace cap, using new lead gasket.

(f) The unit may now be started. Plug cord in service outlet, with sentinel breaker lever in an *up* position (off); slightly purge the expansion valve, push down on sentinel breaker lever (starting machine). Observe if gas is escaping from expansion valve petcock; allow this stagnant gas to escape for about 10 seconds; then close petcock tight.

(g) Allow machine to operate for one hour. If evaporator (chilling unit) frosts completely over, and the return line is reasonably cool, it is not necessary to add more ethyl chloride.

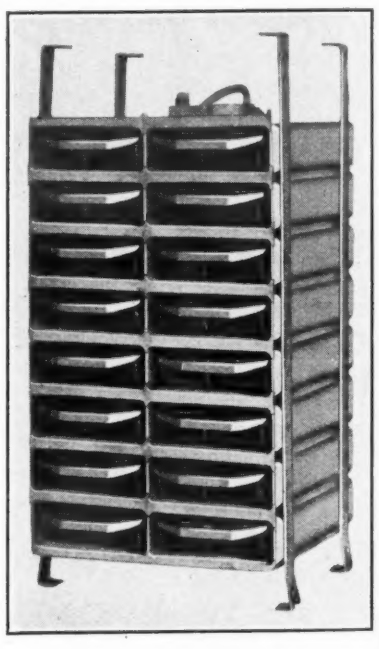
(h) However, if the evaporator does not frost over entirely it will be necessary to add ethyl chloride to the system.

To remove the evaporator, stop the machine by removing plug from electric service outlet; remove charging valve cap and turn valve stem all the way in (to right) until valve seats firmly. Then proceed to disassemble.

Do not remove expansion valve from evaporator until the assembly has been removed from the refrigerator. When disconnecting the expansion valve from evaporator care should be used to prevent oil and liquid ethyl chloride from spilling on the floor. Make this disconnection over sink or some container.

Before installing a new evaporator, set the evaporator on its end and charge the evaporator with one pint of refrigeration oil through the ⅜-in. elbow. (An oil pressure gun should be used for this operation.) Then cap this fitting with a blind nut.

McCORD
ICE MAKERS



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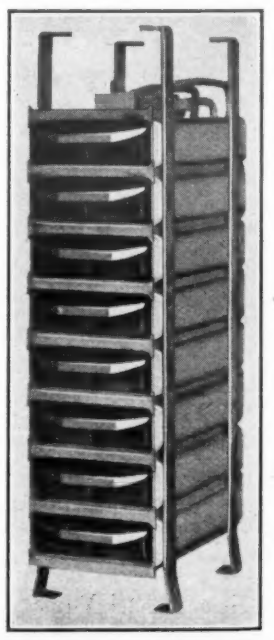
THE McCORD ICE MAKER has several distinct advantages that recommend it to the trade and the buyer. It is of all copper construction tinplated. It has a unique system of manifolding permitting a semi-flooded condition at all times. Because of this system of manifolding it will successfully operate in conjunction with Commercial Evaporators.

The units are furnished with standard 1/2 in. flared fittings and are thoroughly cleaned, dried, and sealed before shipping. A catalog page giving detailed information on request.



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EH&FA Opens Sales Program In Tupelo, Miss.

Lilienthal Bases Claim of Success on Attendance & Sales at Show

TUPELO, Miss.—"Success is clearly indicated."

That was the verdict propounded by David E. Lilienthal, president of the Electric Home & Farm Authority, at the conclusion of the first week (May 21 to 28) of the EH & FA's electrical appliance promotion campaign, staged in this little Mississippi town because the municipality was first to contract for power supplied by the Tennessee Valley Authority.

Following are some of the facts listed by Mr. Lilienthal to back up his statement:

Seven thousand, two hundred and eighty-nine persons visited the EH & FA appliance show the first week.

Nine hundred and forty visitors registered and filled out detailed cards the first three days; so many were willing to register afterward that registration facilities were over-taxed and abandoned.

Sales by four dealers totalled 137 refrigerators and 36 ranges in 17 days, not including the last four days of the show's first week. (The significance of these figures is not clearly indicated; apparently TVA-emblem appliances were sold during this period, but the EH & FA program had not officially opened.)

"I do not think that Tupelo's appliance sales record has ever been equalled anywhere," Mr. Lilienthal said in speaking before a mass meeting on the closing day of the EH & FA week. "Twenty-four thousand dollars worth of ranges and refrigerators

(Concluded on Page 4, Column 5)

Atlanta Dealers Stop Injunction Action

ATLANTA—At a hearing held May 26 before United States Judge W. H. Barrett of the South District of Georgia, Atlanta electric refrigeration dealers requested withdrawal of their action seeking an injunction to restrain the Georgia Power Co. from participating in the sale of TVA-emblem appliances under the program developed by the Electric Home & Farm Authority.

The dealers had previously been granted a temporary injunction by Judge Virlyn B. Moore of Fulton Superior Court when they charged that the EH & FA had forced electric appliance manufacturers and utilities into a plan which would create a monopoly in appliance selling, and so destroy their business.

Selling by Department Stores Is Debated At G-E Meeting

By George F. Taubeneck

CLEVELAND—Can a department store appliance salesman sell more than one line successfully? This was the question which was debated the longest at the Second Merchandising Clinic of department store executives conducted by the General Electric Co. at Nela Park Thursday, May 31.

Although no official decision was handed down, the weight of the argument and the numbers of the arguers seemed to favor a negative answer to the question.

Other topics considered by these merchandising experts included:

Are private brands more effective than nationally advertised brands?

How many lines should be carried and how many resources used?

Number of samples or try-outs to be shown in stock.

What portion of buying appropriation should be used for regular reorders and what portion for promotional items?

Intelligent use of records and stock control systems.

Effective use of want slips.

How important are buying trips

(Concluded on Page 24, Column 4)

Mandel's Department Store Installs Air Conditioning

CHICAGO—First large downtown department store of this city to use air conditioning will be Mandel's on State St. here, where 350 tons of Carrier centrifugal refrigeration using Carrene refrigerant will be started up some time this week. The installation will cool two basements of the building, and is being made by the Chicago office of Carrier Engineering Corp.

Schmidt Appointed Appliance Engineer Of Fairbanks-Morse

CHICAGO — Karl F. Schmidt has been appointed chief engineer of the household appliance division of Fairbanks, Morse & Co., manufacturer of the Fairbanks-Morse refrigerator and other electrical appliances.

Mr. Schmidt, who has had experience as an engineer in the electrical appliance field in South America and Europe as well as the United States, will have charge of the engineering and service organization concerned with refrigeration, washing machines, and ironers.

Copeland Distributors

MT. CLEMENS, Mich. — Appointment of 22 new distributors by Copeland Refrigeration Corp. was announced last week by W. G. von Meyer, sales manager.

New distributors included the following:

Goldner Brothers, Philadelphia; Appliance Sales Co., Inc., Huntington, W. Va.; Tatro Brothers, Kankakee, Ill.; Keil's, Wilmington, Del.; Monroe Furniture Co., Monroe, La.; Edw. N. Eberling & Co., Inc., New Orleans, La.; Copeland Electric Refrigeration Co., Newport News, Va.; Travis-Murray Co., Inc., Oswego, N. Y.; Frank Silver & Co., Inc., Lynchburg, Va.; Bomar-Summers Hardware Co., Louisville, Ky.; Radio Electric Stores, Springfield, O.; B. O. R. Radio Co., Inc., Reading, Pa.; Waters Radio Shop, Inc., Cortland, N. Y.; American Auto Stores Co., Lancaster, Pa.; Meyhart's, Inc., Williamsport, Pa.; Harvey Uhl Electric Co., Akron, O.; Eckart Bros., Inc., Seattle, Wash.; Good Housekeeping Shop, Columbus, O.; Wilbur Templin Stores, Elkhart, Ind.; Griffin Supply Co., Flint, Mich.; Homer King, Inc., Tacoma, Wash.

Crosley Production Is Geared Up to 1,400 Refrigerators Daily

CINCINNATI—With a backlog of orders now on hand for more than 55,000 Crosley electric refrigerators and with additional orders being received daily calling for around 2,000 refrigerators, production in that division of the Crosley Radio Corp. has been geared up to about 1,400 refrigerators per day, Powell Crosley, Jr., president, announced at the annual stockholders meeting held here recently.

Production schedules for the first six months of the current calendar year, Mr. Crosley said, call for the manufacture of more than twice as many Crosley electric refrigerators as were built during the entire 1933 period. Sales for the month of April alone totalled well over the million-and-a-half-dollar mark, Mr. Crosley declared.

No change was made in the personnel of the company's officers and directors at the meeting, the following being re-elected: Powell Crosley, Jr., president and treasurer; Lewis M. Crosley, vice president; Charles Sawyer, vice president; L. K. Kellogg, secretary and assistant treasurer;

(Concluded on Page 24, Column 5)

Tennessee Furniture Co. Plant Making Crosleys

CINCINNATI — The Chattanooga, Tenn., plant of the Tennessee Furniture Corp. has entered into a contract with Crosley Radio Corp. for the manufacture of Crosley electric refrigerator cabinets, according to an announcement made by Crosley Radio Corp. officials.

First shipment of refrigerators from this plant to Crosley distributors in the Tennessee Valley Authority territory was made recently.

35 World's Fair Exhibitions Are Air Conditioned

705 Tons of Refrigeration Now Installed, Exclusive Of Railroad Cars

By John T. Schaefer

(See List of Installations on Page 13)

CHICAGO—Air conditioning is a reality at A Century of Progress this year. Visitors are probably more conscious of air conditioning than any scientific development which the past century has produced, for it is visibly demonstrated by many of the Fair's restaurants, model homes, new streamline trains, and theaters.

Last year there were about 25 installations of air-conditioning equipment at the Fair. This year there are 35 (totaling 705 tons of refrigeration), exclusive of railroad train installations, and possibly one or two more that your reporter may have overlooked. One or two concessionnaires just last week were debating the purchase of equipment.

Last year they were largely experimental in that the purchasers were doubtful about the service they would perform and about their effectiveness in attracting the visiting public. Last year's experience proved that a Fair visitor, overheated and dusty from tramping along three miles of the Fair's lakefront, welcomed a cool place to rest, eat, or listen.

Restaurants are among the "large tonnage" users of air conditioning at the Fair. This is because the body heat of many people must be removed, and because cooking introduces a large quantity of heat—although in some cases the cooking is done in non-air-conditioned spaces.

The Triangle restaurant in the Hall of Science has added a 75-ton York air-conditioning system this year, in-

(Concluded on Page 12, Column 1)

Savage Arms Enters Air Conditioning Field

UTICA, N. Y.—Starting June 1, Savage Arms Corp. took over the development, manufacturing, and merchandising activities on "Zephyr" air-conditioning equipment, formerly manufactured and sold by Air Conditioning Industries, Inc.

Full rights to all "Zephyrair" patents under an exclusive license have been granted Savage Arms Corp. by Air Conditioning Industries, Inc.

Savage Arms Corp. has created a separate air-conditioning division to handle the production and merchandising of "Zephyr" air-conditioning equipment. First new "Zephyr" product is a self-contained, year-'round, cabinet-type air conditioner. (See story on page 11 of this issue.)

Elston D. Herron Finds Buying Has Slowed Down in Springfield, Ill., & St. Louis, Mo.

Refrigeration sales have gone into a tailspin in Springfield, Ill., and dealers there don't know exactly why. They have a good many theories about it, but admit that the latter aren't any too plausible.

The slump came around the first of May. Not by a long shot did business come to a total standstill—dealers aren't down in the dumps about it—but it slowed up enough to be very noticeable after the happy spurt in March and April.

Retailers aren't putting much of the blame on the drought which is threatening Illinois corn crops. Talk about that hasn't been so widely circulated as to close the townfolks' purses, although it may in another month or so. General business in the town is better than it was a year ago, so as a reason for the slump, that's out.

It was down in Virginia and North Carolina that we first began to hear scattered talk about sales falling off May 1, but Springfield was the first town we visited in which *all* refrigeration dealers mentioned it. Let's see what they had to say:

'Like People Got Orders To Stop Buying'—Kunz

Frank E. Kunz, Frigidaire dealer, said, "I haven't any idea what caused it, but I do know that my sales slackened up plenty the first of May. It was just as though people got orders to stop buying on that date. We have kept on advertising and most other businesses here have moved about as usual, but our sales haven't been anything like what we expected, considering what they were earlier in the year."

When we called on Dealer Kunz about a year ago, we reported that he had an "almost ideal setup." The Central Illinois Power Co., his distributor, let him use its building in Springfield as headquarters, and gave him all the display space he wanted in the big salesroom. Everyone who came in to pay a bill had to pass the Kunz Frigidaire exhibit.

So, when we found him no longer quartered in the utility's salesroom,

(Continued on Page 2, Column 1)

Candid camera snapshots taken by the editor at recent dinner for nation's leading industrialists given by Alfred P. Sloan, Jr., president of General Motors (see story on page 1 of May 30 ELECTRIC REFRIGERATION NEWS). Top row: (1) Inventor C. F. Kettering, G-M vice president (left), and Mr. Sloan pay close attention to a proposition. (2) W. S. Knudsen, G-M executive vice president. (3) Mayor Kelly (standing) of Chicago, and Rufus C. Dawes (right), president of A Century of Progress exposition. (4) Mr. Kettering. (5) President E. G. Biechler of Frigidaire. Bottom row: (2) Merlin Aylesworth, president of the National Broadcasting Co. (center) listens to Prof. Walter Pitkin (left), writer of non-fiction best sellers. (3) The guests visit the Union Pacific streamlined train after the dinner. (4) Mr. Biechler again (right). (5) Charles G. Dawes, former vice president of the United States and Ambassador to England (left), smokes his "underslung" pipe, and Dr. Morris Fishbein, president of the American Medical Association, beams.

SPRINGFIELD, ILL., DEALERS

(*Continued from Page 1, Column 4*)

but in a new store at 407 E. Monroe St., we asked why.

"Well, there's the keenest kind of competition, you know, between the Central Illinois Power Co. and the municipally owned plant. The former still has most of the commercial power accounts in town, but the municipal plant is getting most of the domestic accounts. So when the C. I. P. company found that 72 per cent of the Frigidaires I sold last year went on the lines of the municipal plant, I moved out."

The first utility is still a Frigidaire distributor, and sells to Mr. Kunz as exclusive dealer in Springfield. But it gives no display or promotion to Frigidaire, devotes its entire attention to Electrolux (as it sells gas, too). All of which leaves Mr. Kunz in competition with his own distributor.

Frigidaire Dealer Worried By Montgomery Ward

This dealer's total sales for the first five months of '34 are ahead of last year, but he said it has been a man-sized job to keep them that way, in the face of competition from the local Montgomery Ward store. In February, he claimed, Montgomery Ward advertised a 4-cu. ft. refrigerator for $69.50. Now, it is selling a 6-cu. ft. job for $139.50, a seven for $159.50.

Mr. Kunz's pet peeve of the moment is a handout piece being circulated by Montgomery Ward in Springfield, a part of which reads:

"An open letter to anyone interested in buying an electric refrigerator—

"There are definite reasons why Wards are able to build 20 of the industry's most outstanding features into this new line of electric refrigerators—and yet sell them at record low prices.

"These reasons are backed up with facts—not unproved contentions. Refrigerators go direct from the factory to Wards 500 stores—no dealers' profits, and no extra handling charges! Wards use neither expensive national advertising nor costly high-pressure specialty type selling organizations. Wards keep manufacturing costs down through large quantity production. And, Wards do not depend only on refrigerators for business volume. . . ."

The Frigidaire dealer's commercial business has been exceptionally good this season, only difficulty being that it is hard to get deliveries on stock.

"Last year, most of our commercial installations were beer coolers. This year, sales are more diversified; we have put equipment in hospitals, meat markets, restaurants, and have sold some water-cooling systems.

"My service expense has almost doubled this year," he said. "There are two reasons for it—NRA has limited the amount of time my men can put in, and people have come to demand a lot more free service since G-E and Westinghouse came out with their five-year plans."

He has two full-time service men, operates two trucks. His shop has practically every standard service appliance but a dehydrating oven, and his stock of parts is valued at $2,000. The store gives 24-hour service.

Before we left this dealer, he renewed his subscription to Electric Refrigeration News, ordered a copy of the 1934 Refrigeration Directory, and some extra copies of the May 30 (specifications) issue of the News.

"Erratic" was the word Robert Sutton, proprietor of the Music Shop, Norge dealer, used to describe his refrigeration business this year. April was dandy, the first half of May was bad, and sales since have been fair. Total business thus far this year is just about even with '33.

"State and county real estate taxes had to be paid May 1," he said, "and I think that is one cause of our slump. Paying them took down people's supply of cash, and gave a good excuse for not buying refrigerators.

Norge Dealer Says Price Increases Came Too Soon

"Price increases have gone 'way ahead of salary and wage increases, and that has made it hard for people to buy lately. It now takes so much of a person's pay to buy necessities that he has very little left for specialty items.

"I think that if a refrigerator manufacturer were smart, he would strain himself to keep the price of his product down during the six-to-eight-months period of salary and wage adjustment. Another thing that hurt us was the stop in CWA work. That was bringing a lot of money in here."

Bulk of the Music Shop's sales this year have been the smaller and lower-priced models of the Norge line. The store has already sold more 4.7-cu. ft. models than it installed during all of 1933. "Coal miners, mechanics, factory workers make up a good percentage of our buyers this season," Mr. Sutton said.

The municipal power plant gives a special rate on all current consumed by homes having an electric refrigerator, and the Norge dealer finds that a real help in selling. The rate consists of an 80-cent fixed charge, plus three cents per kwh. for the first 48 kwh. per month, and 1½ cents per kwh. for all over 48.

Actually, that means that a home which had averaged $3 per month for current could install a refrigerator and operate it for 32 cents a month, figuring 60 kwh. per month for the refrigerator, explained Mr. Sutton. But if a home had averaged $4 per month before it started using an electric refrigerator, its monthly bill after installing one would be less than before.

Frederick Schlitt of the Schlitt Hardware Co., Kelvinator dealer, isn't much alarmed by the fact that his store's refrigerator sales have dwindled the last few weeks. "I think it is simply political unrest," he said. "So many things have been crammed down the public's throat that folks are merely waiting to see what happens.

Kelvinator Dealer Likes Decline in Price Fixing

"I am on the local code authority board, and lately we have seen increasing evidence that the NRA may be losing some of its potency. Merchants are getting more and more anxious to get away from fixed prices, and start price competition again."

Nor is Mr. Schlitt unhappy about that. He continued: "With prices fixed, competition grows less keen than it was—the very heart of business drops out.

"Why shouldn't there be a difference in prices of a product? If my store does a certain volume of business, I deserve to buy for a lower price and sell for a lower price than some smaller competitors, because I've built up my operation so as to be able to do that.

"Furthermore, I *have* to buy and sell for less than smaller dealers if I'm to keep my store doing its present volume of business. It has been run on that basis, and I can't change overnight."

This dealer's sales to date this year are between 20 and 25 per cent ahead of last season in both household and commercial. Chief worries in domestic selling lately have been free trials and exorbitant ice box trade-in allowances by competition, he said.

WHEN PROSPECTS CALL ON SALESMEN —THAT'S NEWS

BUT It's Happening in Stores Everywhere, Under the Leonard Selling Plan

THE COMPLETE REFRIGERATOR

offers these, and a score of other, great sales advantages

- **Len-A-Dor**—Leonard's famous self opening, step saving door.
- **Cabinets** of beautiful design, superior finish and quality construction.
- **Planned Interior,** with unusual shelf area and storage capacity.
- **New Service Tray,** sliding and adjustable shelves.
- **Improved Dairy Basket** with bottle container; vegetable crisper; electric light.
- **12 Freezing Speeds,** extra fast freezing tray, cold chest, "vacation temperature," ice tray lifter.
- **All-Porcelain Interior,** all-porcelain cooling unit, refrigeration mechanism backed by 20 years' experience.

THERE are many plans to help dealers locate refrigerator prospects, but here is one that reverses the process—*brings prospects, in large numbers, to the salesman in the store.*

Leonard's program is the biggest sales promotion news of the year in the refrigeration industry. Big—because it is operating with tremendous success in hundreds of territories the country over. Big—because it is attracting *interested* prospects—who come to hear the Leonard story, and remain to buy. Big—because it saves so much of the time ordinarily spent in hunting out possible buyers.

Coupled with a refrigerator line of outstanding beauty and quality—with a combination of convenience features unmatched in the industry—this program is breaking all Leonard records for retail sales.

Let us give you the details, and tell you more about the new Leonard Electrics—11 models (5 all-porcelain)—a complete line of merchandise that covers 98½ per cent of home refrigeration needs. Write or wire now . . . Leonard Refrigerator Company, *14256 Plymouth Road, Detroit, Michigan.* NRA CODE

(686)

LEONARD

THE *COMPLETE* REFRIGERATOR

Servel Dealer's Setup Makes Discounts Possible

You don't have to talk to Springfield dealers very long before you learn that they don't like the way the Capital City Paper Co., Servel distributor there, does business.

C. C. Hoogland, vice president of the company, realizes that, and doesn't blame local retailers for their antagonism. Reasons for the latter become apparent when you hear Hr. Hoogland explain the company's setup.

"We have five separate departments—coarse paper and twine, fine papers, dry goods, appliances and radio, and refrigeration. We sell at wholesale through most of Illinois, have 22 field salesmen traveling the territory.

"We haven't franchised dealers to handle refrigeration except in a few special cases; instead, we sell refrigerators just as we do our other lines.

"Any of our field men can sell a refrigerator, at a discount, to any of our old customers who want it for themselves or for their friends. It doesn't matter to us whether the buyer wants it for himself or someone else, just so long as he has bought other merchandise from us at some time.

"Our 22 field men sell just Servel household models, but as they visit food stores to sell paper and twine, they get names of commercial prospects and turn them over to two special field men who sell nothing but commercial units. One of these two men then visits the prospects, attemps to make the sale."

Capital has recently franchised two dealers in Springfield.

The company makes no service guarantee on the houshold refrigerators its sells. If a unit goes bad, the owner himself must send it to the factory.

Two men are employed, however, to install and service the commercial units sold, and the two commercial salesmen are also trained in installation and service procedure. Also at company headquarters in Springfield are three other men who can service commercial equipment when the regular service men are not available.

Sales of this company, too, hit a mild slump about May 1. Mr. Hoogland attributes it to a "feeling of uncertainty as to what general conditions will be the rest of the year."

Said he, "Our field men report that business throughout the state is somewhat improved, but not enough so that people are able to pay their back bills. They are simply making enough to pay current expenses."

St. Louis, Mo.

Refrigeration sales in St. Louis went zooming to a new all-time high in April. But when they took a bit of a tumble early in May, some distributors weren't at all surprised, and none were worried. Business is still so good they can't get enough stock to fill all their orders.

Most of the men we talked to made almost identical explanations of the May sales drop, and are using similar means of combatting it, too. Substance of their theories:

April wasn't just a good month—it was phenomenal. Prospects didn't have to be run down and argued with. They came in and bought, or swung wide the door for refrigerator salesmen calling at their homes.

In other words, there was a brief interim when electric refrigeration didn't require a great deal of specialty selling. The salesmen's work got to be pretty much a matter of order-taking, compared with what it had been in the past.

Then came May, and with it a marked drop in that kind of business because (1) the supply of prospects who were all set to buy when spring came was about exhausted, and (2) political unrest and rumblings of labor trouble in several areas made other "almost-sold" prospects delay buying.

So now, distributors see as their problem simply that of getting their dealers and salesmen to go back to house-to-house work, and do a full-time job of hard-hitting specialty selling. If they will do that, business should be good the rest of the season.

Certainly there is no complaint to be made about St. Louis' refrigeration market possibilities, distributors will tell you. No other city in the country has it beat.

Its population is predominately German—thrifty people who somehow managed to work at something, and save their money, all during the depression. Furthermore, the nationality is one which is food conscious, its housewives "live in the kitchen."

Industries in St. Louis are highly diversified—the town doesn't go smash when one line of business drops off. Banks there came through the Tough Years in better shape than did those in many other places. Principal feature of many St. Louis enterprises is their conservative management and financial stability.

Meter Selling Disturbs St. Louis Retailers

The utility, Union Electric Light & Power Co., is highly cooperative with appliance merchandisers in promoting sales of their goods, and has a low power rate—five cents per kwh. for the first 32 kwh. per month, 2½ cents per kwh. for the next 168, and 1½ cents for all over 200.

Early in the season, it looked as though the St. Louis refrigeration business might get through the year without being much disrupted by price-and-term squabbles, but it didn't last.

The big Stix Baer & Fuller store came out with a meter plan on Frigidaire, announced it with large newspaper space, sold several hundred refrigerators the first few days. Then the Kelvinator distributor made a no-down-payment offer. Union-May-Stern store started advertising sale of Gibson, Copeland, Crosley, and Norge for no down payment and 15 cents a day, and the Lehman Co., big appliance retail outlet, announced that $5 down would deliver a Norge, Grunow, Copeland, Crosley, Gibson, or Leonard.

This is the third consecutive year that some large operation in St. Louis has started meter selling on refrigeration. In '32 the Famous & Barr Co. gave it big play; it still has meters, but doesn't push them. In 1933, it was the Scruggs, Vandervoort & Barney store on Kelvinator.

The St. Louis Electrical Board of Trade was reorganized this spring to include appliance retailers—it formerly concerned itself with wholesaling only—but the reorganization was not completed early enough to give members a chance to do much about poor merchandising practices. Distributors expect, however, that it will do much to clean up the business by another year.

The association, with 250 retail members, plus the city's large electrical wholesalers, is now divided into groups, each concerning itself with merchandising a particular electrical product. Every member contributes to the organization, the amount determined by the size of his operation. The power company gives a substantial sum.

G-E Distributor Has Big Retail Organization

L. D. James of James & Co., Inc., General Electric distributor, told us that since Aug. 1 of last year, the refrigeration business (wholesale and retail) done every month by his company has been better than any like month in the past six years. And in both unit sales and net profit, April of this year was the best month in the concern's history.

This distributor can't see anything in favor of meter selling, and said of it, "It is the worst possible way to merchandise quality appliances. It is effective only as a 60-day activity to shake certain strata of rotten cherries out of the tree, and that's a class of trade we don't want."

James & Co. has no dealers in metropolitan St. Louis, but has 15 outlets of its own in that area, and operates a staff of 150 retail salesmen, the pride of the organization. All of them meet at the distributor's headquarters every morning, and if a man is late to the meetings three times

(*Concluded on Page 4, Column 1*)

A CLOUD-BURST THAT TURNED INTO A TIDAL WAVE

DURING the past few months Grunow distributors and dealers have achieved a record that has never before been equalled in the history of all business.

They, and the American public, have emphatically placed a seal of approval upon, and paid a tribute to a new and revolutionary product, in a way that leaves no doubt as to its supreme value.

This great out-pouring of faith—this unqualified vote of confidence, as expressed by the public in millions of dollars of expenditures for our product, again supports the homely truth, that if you build a better mouse trap—or refrigerator, a path will literally be beaten to your door.

Today Grunow distributors and dealers are practically out of merchandise. Yesterday the same thing was true. Last week, and even last month, in certain sections of the country, Grunow refrigerators were almost sold at a premium. This is the case from Maine to California.

With production facilities that are unquestionably more modern than those of any refrigeration plant in the country—with a plant organization probably more efficient than any in the country and with production *four times as great* as was originally contemplated, Grunow refrigerators still cannot be built fast enough.

We prepared for a cloud-burst, but we received a tidal wave!

We knew we had the *safest* refrigerator in the world. We felt that we had the most *beautiful* refrigerator ever built, the easiest to service, the most economical to operate—and the most profitable for dealers to handle. But frankly, it was not by any means the cheapest on the market. Contrary-wise—it was simply the *finest* on the market.

And who could foretell that in the space of a few short months it would grip the imaginations and hearts of American women to such a degree that more models of Grunow would be sold, in its price bracket, *than of any other make in the country.*

To our distributor and dealer organization which has performed so wonderfully, sincere appreciation. To them all the thanks that go with the thrill of a superb achievement. And to them, also, we offer this sincere explanation of why, despite large production and a real effort to keep up with demand, it has been impossible to do so, even though we have consistently built several times as many refrigerators each day this year as last.

And now we are about to launch what we believe will offer the chance for another great achievement on the part of our selling organization. It is the 1934-35 Grunow radio line, which has occupied the attention of our own and some of the greatest consulting engineers in America for six months past. On this line hundreds of thousands of dollars have been expended in experimental work. This radio combines the finest of all-wave reception with many other spectacular features.

We say here and now that this will be the most startling development that has yet been announced in radio. Cabinet designs, mechanical features and prices will all be revolutionary—and this is not a mere catch-phrase for expressing a thought. In radio our production is geared to fill a terrific demand; because it will be there—never fear.

And, more to come. General Household Utilities Company is not pausing in its experimental work or plans for offering still more extraordinary refrigeration developments that will give them an impregnable position in their respective communities.

Again we say THANKS; and await future developments.

GENERAL HOUSEHOLD UTILITIES COMPANY,
CHICAGO.

Grunow
SUPER-SAFE REFRIGERATOR

ST. LOUIS, MO., DEALERS

(Concluded from Page 2, Column 5)

in succession without excuse, he's fired.

From his dealers in Illinois and Missouri, Mr. James is just beginning to get reports on the seriousness of the drought in those sections, and he remarked to us that if rain doesn't come shortly, general business may suffer a serious blow.

In recent months, this distributor has taken an active part in formulating an electric range promotion program in St. Louis. Union Electric gave attention to it, too, and on March 15 started a sizable advertising campaign on ranges.

Range Wiring Bureau Organized in St. Louis

Then came organization of a Range Wiring Bureau, a combination of range distributors and several local electrical contractors. Under the bureau plan, the contractors have agreed to install ranges in the city of St. Louis for $45, and in other parts of the county for $38. In return for lowering their installation rates, these contractors are given precedence by the distributors.

Union Electric Light & Power Co.'s handling of Kelvinator is not a major factor in refrigeration merchandising in St. Louis, said Mr. James, because the utility never allows its own sales activities to conflict in any way with the cooperation it gives to local dealers and distributors.

W. L. Burton is retail sales manager of the James company and is directly in charge of the 150 retail salesmen. He is smiling these days, because on May 31, his division of the business finished a full year in which every month set an all-time record for that month.

Early in May, traffic in James' retail stores dropped off materially, so Mr. Burton immediately shifted a number of his men from floor duty to full-time outside selling. At the Lindell Blvd. headquarters salesroom, for example, store traffic up to May 1 had justified use of four men on floor duty. Now just one man is being kept there.

Mr. Burton maintains a complete job of specialty selling will lick almost any kind of a slump. "We learned during the depression," he said, "that a balanced job of new calls, callbacks, and night closure calls will make sales in spite of everything. And that is all we needed to whip the mild sales drop early in May."

A. E. Bottenfield, manager of the Norge Co. of Missouri, believes that metropolitan dealers felt the May slump more than small-town retailers.

"The city dealer took on several lines at the start of the year, got ready to do anything but a specialty selling job. That was all right until prospects stopped walking into his store. Now he's at a standstill because he was organized to handle only business of a walk-in type.

Special Contests Help Norge to Beat Slump

"We foresaw that a slump was coming, and so on April 16 started a special contest among all our dealers and salesmen to keep them working for sales. The drive lasts until June 30. They can win merchandise prizes, value of the latter based on the number of points earned, and every 15 days we give $100 in cash prizes to ranking men.

One reason this slump has been a problem to distributors is that many of their dealers and salesmen were new in refrigeration at the start of this year. They (the retailers) got the wrong impression of refrigeration selling from the abnormal influx of buyers early in the season. When the letdown came, they didn't know what to do about it, except start chiseling. It's our job to show them that specialty selling will solve their problem."

To help its St. Louis dealers, the distributor on May 15 started an advertising campaign which calls for use of one advertisement a day for five weeks in some St. Louis paper. All copy is directed particularly at making an entre for Norge salesmen. In addition, Miss Elsa Bradley, home economist, will conduct "Dramatized Chilled Food Institutes" for the distributor's dealers this summer.

Distributor's Service Facilities Complete

This company installs and services all Norges sold by its retailers in the St. Louis area. The distributor doesn't actually install them, but has two transfer companies, the Crondellet Transfer Co. and Plaza Express Co. doing it.

In the service department are two inspectors who call at a home immediately after an installation is made to check on the job, make sure the owner understands proper use and operation of an electric refrigerator. Between 12,000 and 15,000 Norges are now in use in metropolitan St. Louis.

Also in the distributor's service department are six service men, a dispatcher and his assistant to receive all calls and route them, and one girl to do all billing. Service manager is Edward Alexander.

The department is equipped to do anything the factory can in the way of service, has drills, lathes, charging boards, a Despatch oven, etc. A $2,500 stock of parts is kept.

Sales of the distributor for the first five months of this year are 50 per cent ahead of last year, and Mr. Bottenfield said the record would be better than that, had he been able to get deliveries on stock. He was 400 units behind in orders when we called.

The company does no retailing of household refrigerators, but does retail Broilators and Aerolators in St. Louis, and will do the same with Norge commercial refrigeration and oil burners. G. A. Porter is the Broilator salesman, and has sold 70 in the city. Every time one is sold, a chef is sent to work with the purchaser a full day to show him how to use the cooker.

Low Income Group Now Buying—Fitz-Williams

At the Frigidaire factory branch, we found 50 carpenters, painters, and plasterers having a fine time tearing up the place—both floors of it. Herman F. Lehman, new manager, had gone back to Dayton to get his furniture. H. B. Fitz-Williams, sales manager, had got tired of the mess of remodeling, gone to the Coronado hotel to work. We followed him there.

April, he told us, was one of the biggest months in the entire history of the branch, and he has expectations that total '34 business will be double that of last year.

"We don't know whether the amazing buying spirit in April was just a flash, or the start of a buying move that has only temporarily slowed up in May. When the May slump came, we immediately called a series of sectional dealer meetings, told our retailers that it could be overcome by *going out* to sell instead of waiting for a renewal of the April surge.

"Of one thing we are sure—that during the spurt in April, we opened up a market of $1,200-to-$1,500 people who apparently had never been contacted before. Hundreds of prospects, of whom we had no record, presented themselves to our dealers."

Frigidaire Branch Retails Commercial Units Only

The branch now has 27 dealers in metropolitan St. Louis. Until 1931, it had five dealers and a retail force of its own, too. In that year, it converted its retail staff into a dealership, gave up all household retailing, although it continues to use a staff of four commercial salesmen.

This setup is advantageous in that the branch is not in competition with its own dealers, yet it is not so flexible as a branch-operated retail force, Mr. Fitz-Williams explained.

"Commercial business is picking up slowly," he commented, "but it was so bad during the past few years that it was a hard job to maintain a good commercial sales organization.

"I believe commercial activity will increase as time goes on. Many stores have gone out of business, and those opening up to take their place will need new equipment, and the replacement market will be good in the future, too."

Grunow Dealer Can't Get Enough Merchandise

The Brown Supply Co., Grunow distributor, hasn't had a chance to do its stuff this year, according to N. S. Brown, president.

"We were warned by the factory early in the year that merchandise would be hard to get," he said, "so we have done very little advertising, made little effort at special promotional projects. Even so, we're 250 units behind in orders."

Because the low-income man is buying this year, demand has been great for small refrigerators, we were told. Albert H. Brown, brother of the president, said sales to date are double those of the same time last year.

Lindburg's Sales Up 75% Over Last Season

Westinghouse retail operation in St. Louis is the Arthur R. Lindburg Co., having three stores of its own and eight sub-dealers. Manager of the headquarters store is Lee C. Klein. General manager is H. H. Harwood.

Mr. Klein reported that the company is now getting plenty of stock from the factory, is making big play of "immediate deliveries" in its advertising. Sales are 75 per cent ahead of last year.

One of the main store's best "prospect-pullers" is a small stock of old-model electric refrigerators which have been received in trade deals. When prospects come in to see them, attempt is made to sell new Westinghouse models, of course. When we were there, the store had as its drawing cards a Kelvinator, G-E, Copeland, Buckeye, Norge, and Richland.

Main sales tool of Lindburg salesmen this year is the factory-prepared form on which estimates are made of savings possible through use of a Westinghouse. In none of the dealer's stores is the meter plan used.

Mr. Klein said that 6½ and 7½-cu. ft. models have been his store's big sellers this year, and that newlyweds have made up a nice percentage of this season's buyers.

EH&FA Holds First Appliance Showing In Mississippi City

(Concluded from Page 1, Column 1)

sold in 17 days by four dealers, and indications that the total by the end of this week reached $35,000, clearly indicate the success of the EH & FA's program in this section of Mississippi."

The 36 ranges sold in the 17 days cited by Mr. Lilienthal exactly doubled the number of electric ranges in Tupelo homes. A survey had shown 36 ranges in Tupelo homes, with only two of that 36 in actual use, before the TVA program began there.

During the week of May 21 TVA-emblem models of refrigerators, ranges and water heaters were featured in window displays and in booths at the EH & FA showroom.

Dealers' booths gave central positions to TVA-emblem models. Other models in lines having TVA-emblem models were exhibited. Most visitors asked particularly to see the TVA-emblem models, but there was a general interest in all models and all price ranges.

No floor selling was permitted at the EH & FA show.

Brand exploitation was limited to dealers' names and names of their manufacturers above the dealer booths, and the usual appliance labels.

A feature of the EH & FA show was the "home institute" where demonstrations were conducted by Mrs. Mary Tandy, home economist in the department of Miss Eloise Davison, EH & FA electric service director. Other EH & FA officials present included George D. Munger, commercial manager; Guy W. Thaxton, Mississippi manager; William B. Phillips, in charge of promotion; and Stanley C. Reese, architect, who supervised the construction and layout.

"It will only be through the continued cooperation of the manufacturers and dealers in electric equipment that the consumer can hope for success of the EH & FA program," declared Mr. Lilienthal in his address at the mass meeting closing the EH & FA week.

"With that cooperation the price of equipment can be kept at a reasonable level, and a great increase in the use of electric appliances insured.

"The plan calls for equal treatment to independent retailers and utility merchandise departments," Mr. Lilienthal continued, "and any violations of the plan by either party should be immediately reported to the EH & FA."

There have been some protests by dealers in electrical appliances that this plan to distribute the low-cost appliances sponsored by the EH & FA will reduce their margin of profit, Mr. Lilienthal said. But, he pointed out, if the volume of purchases continues at the rate anticipated, the interests of everyone will be protected.

"There is too great a tendency to consider everyone before considering the consumer," the president of the EH & FA stated. "The EH & FA is concerned first and foremost with the consumer. We are organized to see that the consumer gets a square deal, gets the most for his money, and gets an opportunity of having electrical appliances for the comfort of his family, even though he has a modest income.

"The other interests concerned—the manufacturer, the dealer, the utility—must be fairly dealt with and will be fairly dealt with. But none of these interests should get a mistaken idea; this program is intended for the consumer, who has too often been the forgotten man."

Alabama Dealers Meet With David Lilienthal

BIRMINGHAM, Ala.—Progress towards obtaining a fair and equitable deal for independent retailers of household electric refrigerators under the Electric Home & Farm Authority appliance retailing program in the Tennessee Valley Authority was reported last week by Benjamin Leader, Birmingham lawyer retained to represent Alabama dealers and distributors.

Mr. Leader, accompanied by representatives of dealers, journeyed to Knoxville, Tenn., to discuss the matter with David E. Lilienthal, president of the EH & FA. Considerable progress towards a settlement of the situation was made at this meeting, and another conference will be held in the near future, Mr. Leader states.

The grievances of the independent dealers (as elaborated in their letter to George Huddleston, member of the U. S. House of Representatives which was published in ELECTRIC REFRIGERATION NEWS last week) centers about the fact that they are to be allowed a gross profit of only 22 per cent on TVA-emblem appliances, while their estimated cost of selling the appliance, due in part to the low interest charge on instalment sales, is 33⅓ per cent of the sale price.

The dealers also protested that the EH & FA had contracted with the utilities for the sale of these appliances in such a way as to work a hardship on independent dealers.

SELDOM SEEN

MINNEAPOLIS HONEYWELL
CONTROL SYSTEMS

but MOST Important

REFRIGERATION controls are seldom seen by the user, but they are vitally important, for upon them rests the responsibility for the proper functioning of refrigeration equipment. Their visible scales, locking and leveling devices, wide range, accuracy, small operating differential and Con-Tac-Tor Mercury Switches . . . all at no extra cost . . . simplify installation and service. It is to your advantage, therefore, to recommend and install Minneapolis-Honeywell Refrigeration Controls. Minneapolis-Honeywell Regulator Company, 2807 Fourth Avenue South, Minneapolis, Minn. Branch or distributing offices in all principal cities.

MINNEAPOLIS-HONEYWELL Refrigeration Controls are suitable for all types of commercial refrigeration or air conditioning applications. They are available in all desired temperature or pressure ranges

Jarrow Offices Are Slightly Damaged By Crash of Tank

CHICAGO—Jarrow Products Corp., manufacturer of refrigerator gaskets and specialties, suffered only slight damage to its offices and plant last week when the water tank on the roof of the building in which it is located was loosed from its supports and crashed through to the basement of the building, killing or injuring a number of people and causing considerable property damage.

No Jarrow employes were injured and all records without exception were saved, according to H. W. Jarrow, president.

A temporary power line has been drawn into the section of the building in which Jarrow Products Corp. is located, and the company will lose only three operating days, part of which will be made up with overtime, according to Mr. Jarrow.

Mr. Jarrow was traveling by automobile in Cincinnati when the disaster occurred, and with the A. T. & T. Co. keeping an open line between all points to Cincinnati, he was located on the road by the sheriff of a southern Indiana county, and was in touch with his office 45 minutes after the accident had happened.

Salesmen Must Be Paid For 'Pep' Talks After Hours

WASHINGTON, D. C.—Sales promotion managers no longer will be permitted to deliver "pep" talks to a group of employes outside regular hours unless the members of the audience get paid for their time, according to an NRA ruling made effective May 28 by Deputy Administrator Kenneth Dameron and approved by H. O. King, division administrator.

The ruling was in the nature of an interpretation of a question raised by the Code Authority of the retail trade regarding the responsibility of a merchant for the pay of employes attending meetings called by the management. It was held that unless the meetings were for social or educational purposes the employes would be considered as working and should be paid for their time.

421 Refrigerators Sold At San Antonio Show

SAN ANTONIO, Tex.—A total of 421 electric and gas refrigerators were sold during the Spring Refrigeration Show held on the sales floor of the San Antonio Public Service Co. The number of sales set a record for refrigeration shows in this section.

Eleven different makes of household electric refrigerators were exhibited at the show.

The show was advertised by newspapers, radio, and in motion picture houses, and special inducements were offered to purchasers during the period of the show.

Liberty Opens Office In New York City

PROVIDENCE, R. I.—Liberty Refrigeration Corp. has opened a New York City office in the Furniture Mart at 206 Lexington Ave. and has appointed H. C. Godfrey as general sales manager for the New York territory.

Shortly after his appointment Mr. Godfrey announced that R. H. Macy & Co., well-known New York department store, would handle the Liberty line of household refrigerators.

Trenton Moves New York & Pittsburgh Warehouses

TRENTON, N. J.—Trenton Auto Radiator Works, manufacturer of unit coolers, evaporators, and condensers, has moved its New York office and warehouse from 215 N. 68th St. to 210 W. 65th St. and its Pittsburgh office and warehouse from 5145 Liberty Ave. to 5114 Liberty Ave.

61 Sales Closed at Tyler, Texas, Show

TYLER, Texas—During the annual refrigerator show here, the home service director and eight salesmen for the Texas Power Co. closed 61 refrigerator and 15 range sales. Of these, 20 of the refrigerator and 10 of the range transactions were made on the floor during the three-day show.

Taylor Operates Extra Shift in Factory

BELOIT, Wis.—Taylor Freezer Corp. of this city, manufacturer of counter-type ice cream freezers, has been operating on a double shift during the past 60 days to fill orders from dealers, according to John Tyndal, vice president.

The FACT

NORGE ROLLATOR REFRIGERATION IS SMASHING ALL-TIME SALES RECORDS

TOTAL ORDERS FOR THE FIRST FOUR MONTHS OF THIS YEAR EXCEEDED TOTAL SHIPMENTS FOR THE ENTIRE YEAR OF 1933—THE BEST PREVIOUS SALES PERIOD.

The REASON

VITAL DISTINCTION IN PRODUCT AND PROPOSITION!

A beautiful cabinet ... unusual convenience features...a mechanism* that sells itself on demonstration ... forceful campaign of magazine and newspaper advertising ... close cooperation with distributors and dealers. • Write for specific details of the Norge plan.

NORGE CORPORATION
Div. of Borg-Warner Corporation
606-670 East Woodbridge St.
Detroit, Michigan

NORGE
Rollator refrigeration

* THE ROLLATOR
Smooth, easy, rolling power instead of the hurried back-and-forth action of the ordinary refrigerator mechanism. Result—more cooling power for the current used. Only Norge has the Rollator.

Norge Rollator Refrigeration • Aerolator Air Conditioners • Electric Washers • Broilator Stoves • Oil Burners.

AIR CONDITIONING

Edison Institute Report Shows Extent of Air Conditioning Use And Variety of Applications

TO show that air conditioning has been applied successfully for certain purposes in some localities, while other regions have neglected to utilize it for those purposes, the Edison Electric Institute has just issued a report on "Air Conditioning in 1934." It contains a wealth of information intended to aid utility companies in the promotion of increased use of air conditioning, and stresses the viewpoint that the business now being obtained by utilities is only a small fraction of the potential load.

First portion of the report is based on a survey conducted among 26 utility companies holding membership in the institute, to determine the extent of the present air-conditioning load; where and for what purpose it is being utilized; how it is being advertised; and to indicate new uses discovered in certain sections of the country.

The survey requested information on the kinds of commercial and industrial establishments that have installed air conditioning, the total horsepower represented in each class, and data on the need for and benefits produced by air conditioning in various applications. Tabulations of the results are shown below.

Among the 46 classifications into which commercial and industrial installations were segregated, there were comparatively few in which 10 or more of the companies are represented. With the exception of theaters, restaurants, stores, funeral chapels, etc. there was little uniformity in the applications, indicating a large potential untouched market in most cities.

Thus of 31 installations in printing and lithographing shops and allied trades, with a total of 3,481 horsepower, only 11 of the 26 companies showed installations of this class. Only four companies have installations in brokerage offices on their lines, the 12 reported installations requiring 956 horsepower.

Seven companies have air conditioning in local hospitals, their 19 installations totaling 1,155 horsepower. Thirteen companies have bank users of air conditioning on their lines, with over 5,000 horsepower in 47 installations.

The survey produced 49 different classifications of air-conditioning installations: 20 industrial, 26 commercial, and 3 personal. There existed among these a total of 1,993 installations, including 269 industrial, 1,220 commercial, and 504 personal installations.

Data was given by the following:

Commonwealth Edison Co., Chicago; Union Electric Light & Power Co., St. Louis; Edison Electric Illuminating Co. of Boston; Pacific Gas & Electric Co., San Francisco; Union Gas & Electric Co., Cincinnati.

Potomac Electric Power Co., Washington, D. C.; Rochester Gas & Electric Co., Rochester, N. Y.; Public Service Co. of Northern Illinois, Chicago; New Orleans Public Service Co.; New York Edison Co.; Philadelphia Electric Co..

Northern States Power Co., Minneapolis; Commonwealth & Southern Corp., New York City; Nebraska Power Co., Omaha; Texas Electric Service Co., Fort Worth, Tex.; Public Service Co. of Colorado, Denver; Public Service Electric & Gas Co., Newark.

Memphis Power & Light Co., Memphis; Detroit Edison Co., Detroit; West Penn Power Co., Pittsburgh; Duquesne Light Co., Pittsburgh; Brooklyn Edison Co., Brooklyn; Consolidated Gas Electric Light & Power Co., Baltimore.

These represent the power generating service for over 20,000,000 metropolitan population.

Table 1 - Industrial Classifications

Class of Business	No. of Companies Reporting Installations	Total No. Installations	Total Hp.	Average Hp.	Largest Installation	Smallest Installation
Bakeries	10	52	947	18	....	....
Candy	16	60	6,046	101	520	2.5
Chemicals and Drugs	9	16	2,398	150	540	2
Cooperage	1	2	40	....	....	....
Creameries	2	3	43	14	....	....
Fruit Ripening & Storage	3	5	97	....	40	3
Citrus Fruit Packing	1	10	1,650	....	....	....
Food Specialties (Jello-Pecans)	3	4	34	....	30	1
Leather Tanning & Mfg.	2	3	503	163	266	....
Meat Packing	5	17	2,395	140	....	....
Miscellaneous	5	22	627	29	....	....
Paper Containers	1	1	75	....	....	....
Photographic Films	3	6	21,748	3,625	....	....
Printing & Lithographing	11	31	3,481	112	350	1
Textiles	5	20	2,151	108	1,000	25
Tobacco & Cigar	4	12	943	79	....	....
Telephone Cable	2	2	1,153	577	1,085	68
Cork Products	1	1	104	....	....	....
Sugar Storage	1	1	(Not Given)	....	....	....
Oil Testing	1	1	80	....	....	....

Note: Details on industrial installations not available from Brooklyn Edison Co., who mention, however, many bakeries and candy manufacturers.

Note: Because of the form in which the questionnaire figures were submitted, it was impossible to determine the size of individual installations in each case. Where possible, the largest and smallest installations in each class of business are shown as a matter of general interest and to indicate the wide variation which may exist in the same line, due to size of customer's requirements, or extent to which air conditioning has ben applied.

Uses and Advantages of Air Conditioning for Industrial Purposes

(*See Table I*)

Table I shows 20 classifications of industrial air conditioning. A total of 269 installations are reported, with 44,515 hp. of connected electric load. With the exception of candy manufacturing, baking, chemicals, and printing and lithography, this list is made up of industries in which very few of the reporting companies have air conditioning.

To a certain extent, this is unavoidable, as some of the largest industrial users of air conditioning are sectional, with few cities having factories of the particular kind.

The manufacture of telephone cable, for example, is only carried on, to any great extent, in Hawthorne, Ill., and Baltimore. Other cities have no opportunity for this class of air conditioning.

The same principle holds, more or less, of such sectional industries as tobacco manufacture, the production of photographic film, textiles, etc.

Necessity in Some Industries

In some industrial operations, such as textiles, tobacco, drugs, etc., certain forms of air conditioning are practically a necessity. Definite humidity or temperature conditions have to be maintained in order to make a product.

The penalty for not providing air conditioning is so large in spoilage, lost time, inferior product, and slowed up production that such manufacturers have come to regard air conditioning an essential feature of their factory equipment.

There are other manufacturing processes, however, where air conditioning is not vitally necessary, but where its benefits are great enough to well justify its installation. The following is cited by the report as an illustration:

A meat packing establishment decided to condition the air in the room where meats from the smoke house are processed and packed. By maintaining controlled temperature with high relative humidity, loss of weight was eliminated; the meats retained their moisture and did not shrivel or wrinkle. The finished product had a better appearance, weighed more, and was more salable.

Industrial Uses

A summary of the uses in each of the industrial classes follows:

Bakeries: Used in dough rooms and proofing rooms, to give better product and uniform, controlled production (Washington, D. C., Chicago, San Francisco.)

Manufacturer of fancy cakes greatly reduced his manufacturing time, cut cost, and improved product. (New Orleans.)

For cooling mixing room and cooling bread after baking. (St. Louis.)

Candy: Prevents losses of product, spoilage, and insures uniformity and increased production. (New Orleans.)

Facilitates hardening — cleanliness in wrapping—employe efficiency. (Chicago, Pittsburgh.)

Special conditions for coating candied nuts, etc. (St. Louis.)

Quick hardening of chocolate and preservation of candy during summer. (Washington, D. C.)

Enables firm to manufacture chocolates in summer, when such plants are ordinarily closed down. Air conditioning used in starch rooms, enrobing or coating rooms, storage and packing, and also in company offices. (Baltimore.)

Chemicals and Drugs: Manufacturers of hygroscopic chemicals or drugs have to maintain fixed conditions of humidity to prevent spoilage of product. Variety of products—Bromo Seltzer, photographic emulsions, serums, etc. (St. Louis, Rochester, New York City, Omaha, Baltimore.)

Creameries: For cooling in butter wrapping room. (St. Louis.)

Maintain suitable working conditions. (Denver.)

Cleaned air also should be a factor in preventing contamination.

Fruit Ripening: Used in rooms for ripening bananas, to reduce spoilage, and control the ripening period. (Boston, New Orleans.)

Food Specialties: Manufacturer of Jello uses dehumidification. (Cincinnati.)

Producer of shelled pecans requires low humidity for protection against spoilage losses and to improve quality of product. (New Orleans.)

Leather: Tannery uses air conditioning in hide storage cellars. (St. Louis.)

Meat Packing: Improves sausage product. (Washington, D. C.)

For processing hams and sausage—high humidity. (Rochester.)

Prevents shrinkage and loss of weight; gives improved appearance to product. (Baltimore.)

Miscellaneous: Mushroom grower has a 30-hp. installation to maintain 70° F., and 70% relative humidity. (Denver.)

Curing room for cement testing is equipped with air conditioning to provide 70° F. and 98% relative humidity. (Denver.)

Malt manufacturer uses air conditioning. (Chicago.)

Possibility of use in rooms devoted to wine and beer storage, as it is suggested that humidity and purity of air, as well as temperature, affect the quality of the product.

Photographic Film: Large installations at Rochester in connection with the manufacture of photographic film and positive papers. To set emulsion and to insure clean air at constant conditions for process cooling.

Printing and Lithography: Facilitates production and improves quality through drying of ink; elimination of static; removal of dirt; removal of heat from type melting. (Chicago.)

Maintains proper humidity for accurate lithographic reproduction. (Cincinnati, New Orleans.)

Humidification and air circulation for elimination of static electricity. (Washington, D. C.)

Controlled humidity to prevent paper stretching and shrinking—to insure register. (Rochester.)

To prevent expansion and shrinkage of wooden blocks on which engravings are mounted. Insures accurate reproductions in technical publications. (Baltimore.)

Textiles: Manufacturer using rayon yarns employs air conditioning to prevent stretching of threads. Rayon very sensitive to humidity. Eliminates seconds and spoiled merchandise. Before installation it was impossible to manufacture during summer. (Philadelphia.)

Manufacturer of cotton products maintains 45% relative humidity. (Texas.)

Silk manufacturer maintains 75 to 80% relative humidity (no temperature control) facilitates production and insures better quality of product. (Chicago.)

Tobacco and Cigars: Control of curing and process. Permits working tobacco regardless of weather. Better and more uniform product. Increased efficiency and reduction of lost time on part of employes. (Philadelphia.)

Improved working of tobacco and special processing to improve quality. (New Orleans.)

Telephone Cable: Maintaining extremely low humidity in rooms where cable is covered to eliminate any trace of moisture in finished cable. (Baltimore, Chicago.)

Cork Products: Bottle cap manufacturer uses air conditioning in rooms where specially prepared sticks of granulated cork are handled. Prevents binder from softening. (Baltimore.)

Sugar Storage: Storage losses reduced and product improved. (New Orleans.)

Fruit Storage: Enables producer to hold stock for satisfactory market conditions. Citrous fruit storage.

Rayon Manufacturer: Air conditioning is used throughout factory engaged in making rayon. Practically all of the air that comes in contact with the production in its various stages is air conditioned. Conditions vary in different rooms, ranging from 63 to 97% relative humidity, and from 63° to 75° F.

Help for Salesmen of Air Conditioning

To aid the salesman in locating best prospects for air-conditioning equipment, this article is presented through courtesy of the Edison Electric Institute which collected the information on which it is based.

Outlined in the article are numerous applications of air conditioning, showing many which are relatively untouched in many cities, and the reasons why air conditioning has been useful in the operation of such business establishments.

Uses and Advantages of Air Conditioning for Commercial Purposes

(*See Table II on Next Page*)

Table II shows 26 classications of commercial air conditioning, with a total of 1,220 installations reported, and a total connected electric load amounting to 134,388 hp.

The bulk of this business is concentrated in a few fields; viz., theaters, restaurants, department stores, hotels, office and public buildings. Of these, theaters and restaurants are ordinarily completely air conditioned.

The others, however, such as department stores, hotels, and office buildings, are only partially air conditioned. Certain floors, or departments, may be thus equipped while the remainder of the building is unimproved.

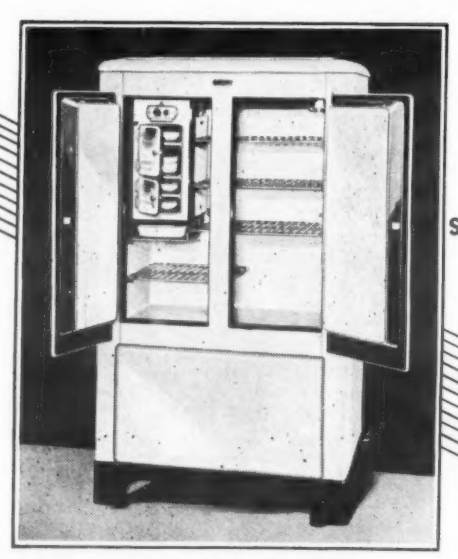
The comfort factor, with its effectiveness in attracting customers and in promoting a more receptive buying attitude, is the central advantage of almost every commercial air-conditioning installation. The ramifications of this feature are many, including such points as advertising value,

(*Concluded on Page 7, Column 1*)

HOUSEHOLD ELECTRIC REFRIGERATION *by*

TRUSCON

PROFITABLE *for* DEALERS
EFFICIENT AND ECONOMICAL
• *for* CONSUMERS



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SELL ESCO ice makers NOW!

These Ice Makers are MONEY MAKERS for you. Especially during this HOT WEATHER

Hotels, Restaurants, City and Country Clubs, Hospitals, Estates, Sanitariums and Institutions of all kinds . . . say

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ESCO ICE MAKERS SELL QUICKLY, because they are built to make good—completely engineered—dependable—efficient—economical—thoroughly insulated—of rugged construction—Every ESCO ICE MAKER is backed by the guarantee of the ESCO name.

With an ESCO, the user has definite control over the quality and quantity of his ice supply. He has ice when he wants it—as much or as little as he needs—without unnecessary and costly waste.

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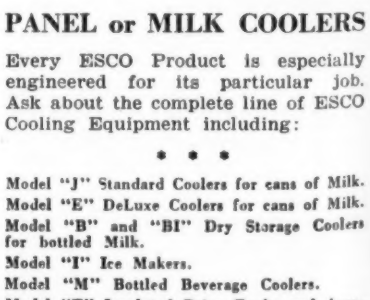

PANEL or MILK COOLERS

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Model "J" Standard Coolers for cans of Milk.
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Write NOW! Get complete information, Latest ESCO Manual and Sales Literature.

Various Applications Of Air Conditioning Classified in Report

(*Concluded from Page 6, Column 5*)

prestige, competitive advantage, etc.

Commercial Use

A summary of the comments received from various reporting companies provides a comprehensive list of the arguments in favor of air conditioning for commercial needs.

Banks: For comfort of patrons and comfort and health of personnel. A prestige factor—to attract customers—to promote working efficiency. One bank has an installation in vault to prevent corrosion. (Cincinnati.)

Beauty and Barber Shops: Advertising value and comfort factor to attract customers.

Broadcasting Stations: Better performances under more comfortable conditions. (Chicago.)

Brokers Board Rooms and Exchanges: Comfort, cleanliness, and efficiency, and attracts business. (Chicago.)

Business Offices: Increased efficiency, improved health, cleanliness, elimination of noise, reduction in loss of time through sickness.

Clubs and Apartments: Eliminates seasonal slump in patronage. Apartment house conditioned the upper floor apartment, with three rooms supplied from a 1-ton compressor placed under kitchen sink. Direct expansion coils and fan were mounted on shelf of a closet which adjoined the three rooms. Supply grilles led to each room and by means of a shutter arrangement conditioned air may be supplied to each room as it is occupied. Low first cost and low operating cost. (Chicago.)

Churches: Larger attendance in hot weather.

Funeral Chapels: Good will and prestige factor. Attracts clients by providing better surroundings and comfort during services.

Halls: A factor in renting halls and auditoriums for meetings in hot weather.

Hospitals: For operating rooms—comfort for surgeons, elimination of noise, and enhanced cleanliness.

Special rooms for treatment of pneumonia and other pulmonary diseases. Relief for sufferers from hay fever and asthma.

Hotels: Practically all installations are in hotel restaurants, meeting halls, barber shops, or special suites. No completely air conditioned hotels.

One hotel installed air conditioning in refuse room to prevent odors which would be offensive to guests. (Washington, D. C.)

One hotel has a special air-conditioned suite for which extra charge is made. Always in high demand. (Pittsburgh.)

Libraries and Museums: To control humidity and eliminate dust and dirt as a factor in preserving books and other exhibits. Also provides improved comfort and health conditions for personnel and visitors. (Baltimore.)

Private collector equipped room to protect his collection of first editions. Humidity control. (Baltimore.)

Miscellaneous: Research laboratory—to reduce dirt and provide working comfort. (Detroit.)

Medical Offices: Improved personal efficiency; relief for patients. (New Orleans.)

Office Buildings: Important from office rental viewpoint. Second floor of a 23-story office building had been untenanted for six years, due to the dirt and noise nuisance of mid-city section. Floor area of 15,000 sq. ft. was treated with double glazing and a 30-ton cooling plant. Temperature and humidity conditions provide ideal working quarters. Dust and dirt eliminated and exterior noises pass unnoticed. Space converted into a profitable, income-producing unit. (Chicago.)

Restaurants: Increased patronage and increase in average sale in hot weather.

Sales and Display Rooms: Department store installed air conditioning in a specially constructed room in which their mid-summer fur sale was conducted. Advertising value and more suitable conditions for selection of merchandise. (Baltimore.)

Shoe Repair Shops: Small shoe repair shop, located in crowded, downtown district, installed two 1½-hp. cooling units. These proved so successful that the same owner placed orders for similar equipment for two other shoe repair shops. (St. Louis.)

Department Stores: Prestige, advertising, and good will value. Attracts larger patronage in wealth when business ordinarily falls off.

Because of comfortable shopping conditions, purchases are larger. Increased efficiency of employes. Saving of merchandise from dirt and perspiration in handling.

Theaters: Practically a necessity with present competition and public demand for comfort during diversion. Eliminates summer slump in theater patronage, and during excessively disagreeable weather produces above-the-average attendance because of number of people who go to escape the heat.

General: Sales arguments used to interest commercial prospects:

1. Business building through human comfort.
2. Modernization of buildings.
3. Improved health and working conditions.
4. Improved employe efficiency.
5. Economy.

(New Orleans.)

Table 2 - Commercial Classification

Class of Business	No. of Companies Reporting Installations	Total No. Installations	Total Hp.	Average Hp.	Largest Installation	Smallest Installation
Banks	13	47	5,058	107	....	..
Beauty & Barber Shops.	6	8	78	10	30[1]	..
Broadcastings Stations..	8	13	852	66	150	..
Brokers Board Rooms and Exchanges	4	12	956	80	....	..
Business Offices	4	12	599	50	435[2]	3
Clubs & Apartments....	3	9	410	45	....	..
Churches	4	7	183	26	48	10
Depots	1	2	23	...	....	..
Florists	1	1	3	...	....	..
Funeral Chapels	18	38	284	8	21	..
Halls	5	14	1,111	80	445	..
Hospitals	7	19	1,155	60	706	..
Hotels	14	72	9,951	138	....	..
Libraries & Museums...	5	7	511	73	327	1
Miscellaneous	2	6	130	22	50[3]	..
Medical Offices	10	17	258	...	225[4]	..
Office Buildings	9	105	12,692	121	2,275	..
Public Buildings	3	38[5]	14,476	...	....	..
Recreation Center	1	1	3	...	....	..
Restaurants	24	248[6]	7,328	30	....	..
Sales & Display Rooms.	7	28	235	8	80	..
Schools	4	19	264	14	....	..
Shoe Repair Shops.....	1	3	7	...	....	..
Stores (Department)	17	44	11,771	268	....	..
Stores & Shops (Small).	21	149	1,827	12	....	..
Theaters	24	301	64,223	213	....	..

1—Barber shops, 30 hp. 2—National Geographic office. 3—Research laboratory. 4—Apparently a professional building. 5—Includes 24 U. S. government buildings at Washington, D. C. 6—Part of "Hotel" class. Is comprised of restaurants.

Uses and Advantages of Air Conditioning for Personal Use

(*See Table III*)

Because of the small size of the installations in this group, and the fact that there are many agencies engaged in the sale of various standard air-conditioning and room-cooling units, it is probable that the figures given in Table III are not complete, the report admits, because unless a thorough canvass of the territory is maintained, installations of this kind are apt to escape the attention of the utility company.

Comfort, the alleviation of certain diseases such as hay fever and asthma, and relief for the aged or sick, are the principal reasons for air conditioning in residences.

The first two points are also the important factors in private office installations, together with cleanliness and the elimination of noise. Human comfort, health, cleanliness, and pride of ownership are the arguments that appeal in this field.

Progress which manufacturers have made in developing unit equipment for single rooms, combined with the publicity which is being given air conditioning, is attracting the attention and the interest of a rapidly growing number of people. One indication of this is the increase in the number of personal installations made during 1933.

Despite the fact that the average horsepower is small, personal air conditioning is a field of tremendous potential possibilities for the utility, the report states.

"To the man of average means, home comfort and health are matters of large importance, and the investment in home improvements and modern facilities to obtain this objective is relatively large. It is usually made with a willingness and interest that is partly due to pride of ownership and partly the desire for a continually bettered standard of living."

The convenience and ease of conditioning part of a home—living room, sleeping quarters, for example—with equipment that will produce dependable results is a feature that will induce many to initiate this improvement. The health factors, relief for sick or bed-ridden, are also points that deserve to be vigorously pushed, as there are many cases where cooled and conditioned air will result in earlier recovery, will ease the burdens of pain and illness, and even ward off death.

Table 3 - Personal Classification

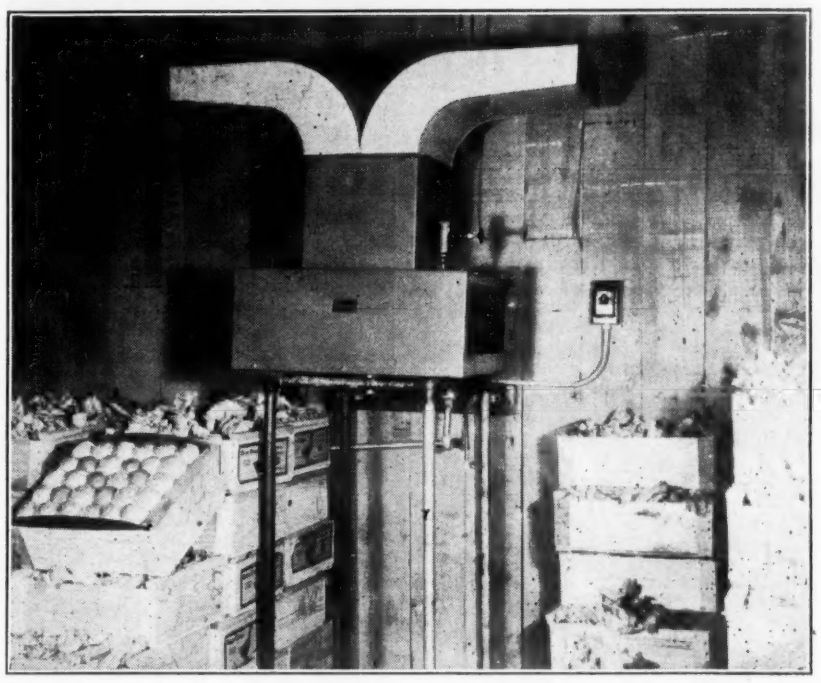
	No. of Companies Reporting Installations	Total No. of Installations	Total Hp.	Average Hp.	Equipped with Central Plants	Equipped with Cooling Units
Homes (Total)	8	14	92	6.5	12	2
Homes (Partial)	22	265	507	1.9	54	211
Private Offices	20	225	784	3.5	13	212

Conditioning Engineers To Meet June 12-14

CHICAGO — Members of the Air Conditioning Engineers Society, directed by E. Vernon Hill, air-conditioning engineer, will meet June 12 to 14 in the assembly hall of the Chicago Lighting Institute for their first national convention. At the sessions, they will elect officers, adopt constitution, and hear discussions on engineering phases of air conditoning.

This conclave will come near the conclusion of an air-conditioning exhibit which is being held from June 4 to 16 by the society.

General Electric Air Conditioner Used to Ripen Tomatoes

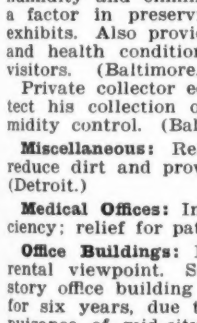


MINNEAPOLIS—A General Electric air conditioner, type AC-1, installed in the tomato ripening room of the Morris Fruit & Produce Co. here, saved its cost in the first carload of tomatoes by preventing the usual loss from drying out which occurs under ordinary atmospheric conditions, according to firm officials.

The ripening room holds two carloads of tomatoes, and before the installation of air conditioning as high as 20 per cent of each carload became spoiled because of loss of moisture. Previous attempts to keep the tomatoes moist by periodic sprinkling failed to meet with appreciable success because only the top layers received proper moisture.

To promote ripening, the room is maintained at a fairly high temperature, the G-E air conditioner holding relative humidity at approximately 70 per cent throughout the ripening room. Under these conditions, all tomatoes in the room are not only prevented from drying out, but actually tend to regain their natural moisture content, the product remaining firm and solid.

Use the MASTERCRAFT REFRIGERATOR PAD and CARRYING HARNESS



They will deliver your refrigerators—

1. *More easily*, because adjustable features give neat, snug fit and sturdy handles make easier handling.

2. *Safer*, because they are strongly built and pad is heavily stuffed.

3. *More economically*, as adjustability feature requires only one pad or harness, and prices are

ONLY $7.50 for Pad
ONLY $4.75 for Harness

For quantity of four or more, 50¢ less for each. Name of refrigerator lettered on pad without charge. Prompt shipment from stock.

BEARSE MANUFACTURING CO.
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How do YOU meet a Sales Situation like THIS?

WHEN YOU LOSE SALE AFTER SALE BECAUSE TOO MANY BUYERS KNOW WHERE TO GET SPECIAL DISCOUNTS

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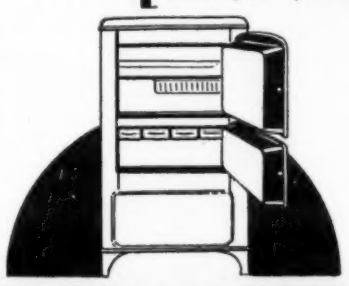
WHAT CAN YOU DO ?

POTTER OUTLETS HAVE THE ANSWER!
If you want to know what they do about it, write us and we will tell you! Let us tell you, also, about the Exclusive Potter Franchise.

This is the 6th in a series of Potter messages on meeting the problems which limit your profits. Number 7 will appear in the next issue of E. R. N.



POTTER
REFRIGERATOR CORPORATION
Buffalo, New York

Lee Shows with Drawings How Various Buildings Are Air Conditioned

By Colin K. Lee, Air-Conditioning Div., Westinghouse Electric & Mfg. Co.

In a Private Office

(Portland Cement Association, Chicago)

A private office should be a place to think, to meet other men, and to make correct decisions, things which are not easy to do when an open window is letting in summer heat, city dust, and the roar of traffic.

The Chicago office of the Portland Cement Association is admirable for its purpose so far as architecture goes;—but the air conditioning which protects it from heat, dirt, and noise might escape notice entirely, so unobtrusive is it.

The low-type year-'round conditioning unit beneath the window at the right draws its supply of air from outdoors through a duct concealed by the inner window.

The 12,000 B.t.u. condensing unit is hidden in a closet, nearby; an arrangement which is made possible only by the compactness and small dimensions of the design. The length of run between conditioner and condensing unit is only about 7 ft.

In a Fine Old Home

To anyone who has tossed wakefully through the heat of a summer's night, the value of coolness and sleep is not to be measured in dollars.

Though this stately residence is outside that Middle Western area, where midsummer's heat closes down over the earth like a brazen bowl; nevertheless its owner feels his investment in comfort was wisely made. His friends, called in by the proud owner, think so too; for several of them are planning to follow his example.

Two bedrooms on the second floor are conditioned. The condensing unit is located in the basement, and the connecting tubing (⅜ in. and ⅝ in.) was run up through an existing unused old pipe, or duct, fortunately discovered in the wall. It was thus unnecessary to cut any holes in the wall; and only two pieces of floor had to be taken up and replaced.

In a Restaurant

(Harvey's, Washington, D. C.)

When eating is to be an occasion of dignity and import, rather than a hurried necessity, it is to Harvey's that senators and their like are wont to go, especially if bent on seafood, which is the establishment's specialty.

Architecturally, it is rather unusual: quite narrow and deep, but occupying three floors. It is the first and second which have been air conditioned.

The installation combines summer and winter air conditioning. Of the nine conditioning units which cool and dry the air in summer, three also serve to warm and moisten the air in winter.

Each floor has its own air-conditioning system. On the first floor are five floor-type conditioners, each rating 12,000 B.t.u./hr. Two of these are for both summer and winter operation.

On the second floor are four floor-type conditioners, of which one operates the year 'round.

Two condensers, one for each floor, are located in the basement. In winter, steam is supplied to the three heating conditioners from a gas-fired boiler in the basement.

In summer, each floor is separately controlled by its own thermostat which starts and stops its condenser as necessary to keep the temperature constant. In addition to thermostatic control, the condensers may be started up by hand switches located at the conditioning units.

In winter, a clock thermostat on the second floor acts to control the gas supply of the boiler, and hence the steam supplied to both floors. The separate floor thermostats then merely control the fans and humidifiers in the conditioners.

The refrigerant and drain lines had to be run in an unusual manner, because under most of the building there is no basement. So in order to get the necessary drop, or gradient, in the drain lines, "high type" conditioners were used, in which the cooling elements are some distance above the floor; and the refrigerant tubing and drain was run in a metal shield just above the existing baseboard. A chase was also cut in the brick wall to give added space for these lines.

In a Large Public Space

(Emigrant Industrial Savings Bank, New York City)

A great many people crowd into 42nd St., New York, but they do not come there for coolness or fresh air; and the bank officials whose desks were in the area shown at right on the floor plan shown above, found summer very oppressive . . . the more since this area formed a sort of dead-air pocket.

It was off to one side from the direct path between the doors on 42nd and 43rd Sts., and it was further isolated by the railing which shut it off from the aisle, and by the ceiling, which was lower over the desk space than in the adjoining aisle.

So, early in the summer of 1933, two low-type conditioners were located in this space, served by a 24,000 B.t.u./hr. condensing unit concealed in the basement nearby.

Later in the summer, the cooling service was extended to the area at the other end of the bank; the tellers' open counters which take the place of the old-time "cages," and an office at the 43rd St. entrance.

The tellers were given six low-type conditioners, arranged perpendicular to the line of the counter, and fed from a 72,000 B.t.u./hr. condensing unit located in the basement.

The office has two low-type conditioners, served from a 24,000 B.t.u./hr. condensing unit in the basement.

The total capacity of the installation is now 120,000 B.t.u. per hour, and the bank's summer business can be conducted by employes who are cool and efficient, and customers whose dispositions are unruffled by summer's heat.

In a Small Store

This smart little dress shop presented not only a problem in cooling (for there was a heavy sun-load to combat), but in circulation as well; because the little fitting rooms, or cubicles, were naturally unfavorable to the circulation of cooled air, and three of them were located in under a low mezzanine, or balcony.

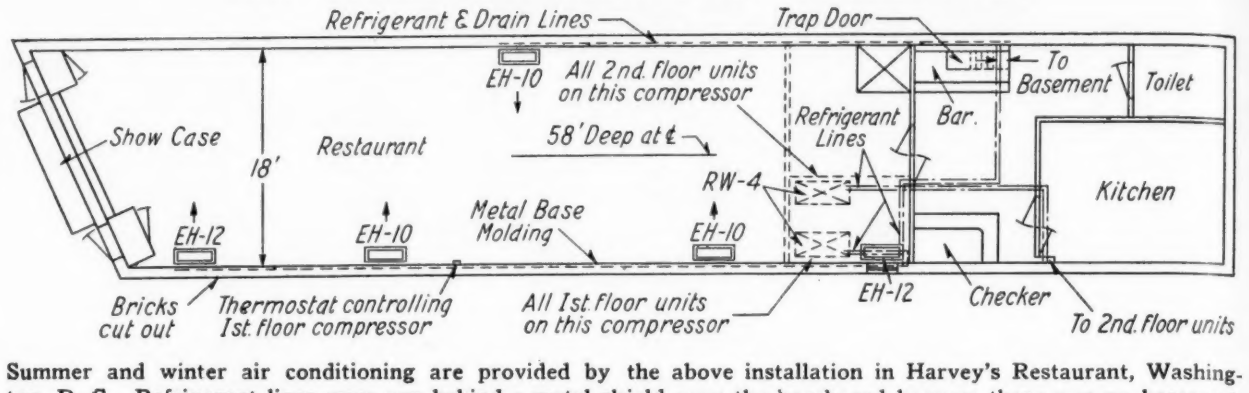
Yet it was precisely these spots which it was essential to cool, to avoid the perspiration injury to new dresses in trying-on, which is one of the expenses involved in selling dainty clothes to women in hot weather.

The situation was met by installing three suspended-type conditioning units, each with a capacity of 12,000 B.t.u./hr., and so located as to aim their blasts of cool air at the fitting rooms. Two of the conditioners are located in the front of the store, on top of the closed dress cabinets, and about 8 ft. from the floor. The third conditioner is under the mezzanine.

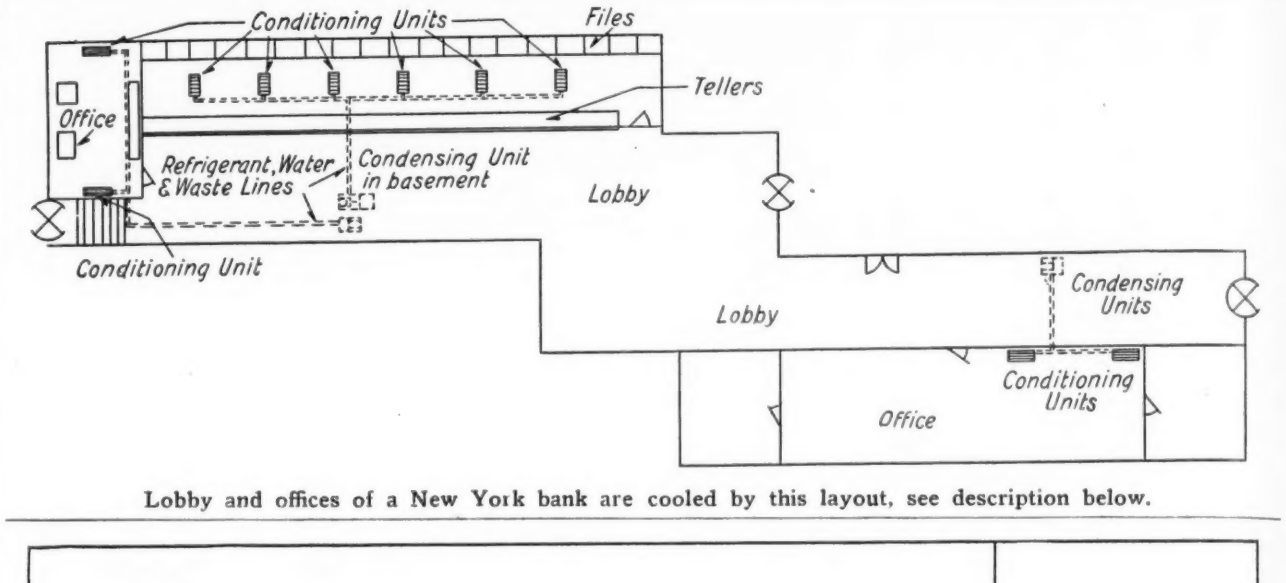
Circulation inside the fitting rooms is provided for by ventilators in the baseboards.

Two 24,000 B.t.u./hr. condensing units are installed in the front of the basement, one supplying the two front conditioners, and the other the rear one. There is thus capacity available for a future conditioner in the rear.

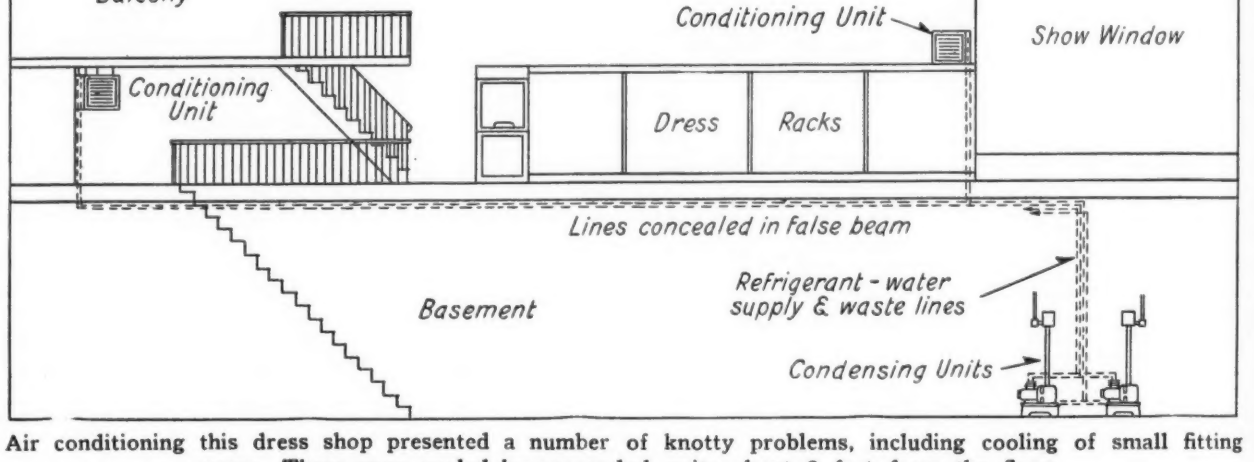
How Three Different Jobs Were Done



Summer and winter air conditioning are provided by the above installation in Harvey's Restaurant, Washington, D. C. Refrigerant lines were run behind a metal shield over the baseboard because there was no basement.

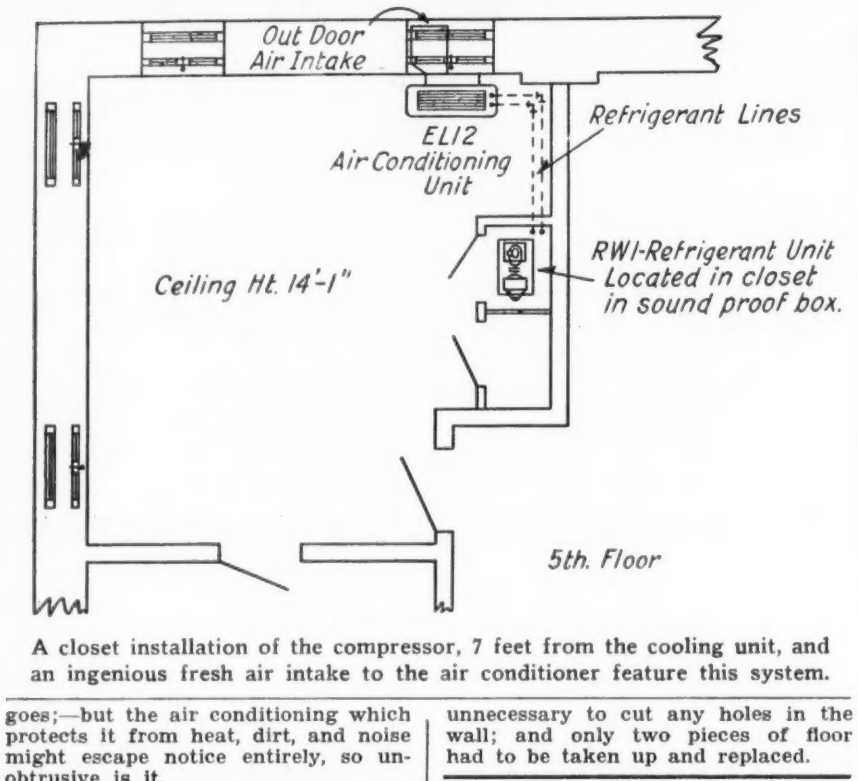


Lobby and offices of a New York bank are cooled by this layout, see description below.

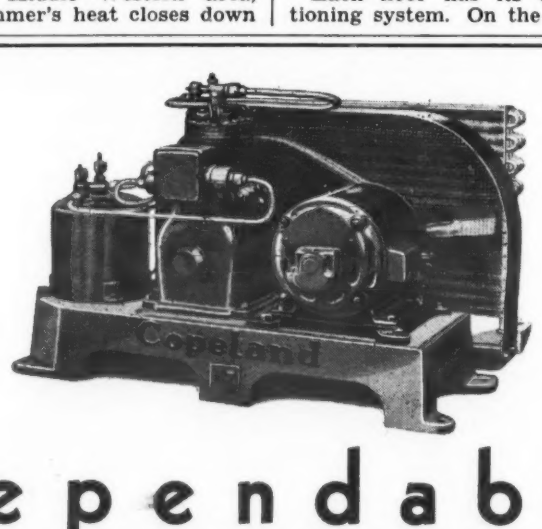


Air conditioning this dress shop presented a number of knotty problems, including cooling of small fitting rooms. These were cooled by suspended units about 8 feet from the floor.

Application in a Private Office


Out Door Air Intake
EL12 Air Conditioning Unit
Refrigerant Lines
RW1-Refrigerant Unit Located in closet in sound proof box.
Ceiling Ht. 14'-1"
5th. Floor

A closet installation of the compressor, 7 feet from the cooling unit, and an ingenious fresh air intake to the air conditioner feature this system.



Dependable

More than any other attribute demanded by the buyer of any Commercial Condensing Unit is the quality of "Dependability." It must deliver, day in and day out, its rated capacity. So much trouble can be caused by operative failures that it is folly to take chances with unknown, untested mechanisms.

No unit can be fully efficient unless it is inherently correct in design—built to precise specifications—tested beyond possibility of functional failure—and backed by a manufacturer who is proud of his product.

Copeland meets all these requirements. Thousands of Commercial Units, all over the world, testify to the dependability of Copeland. Every item comprising the completed unit is carefully designed for its specific task; manufacture is surrounded by every safeguard known to modern engineering science, resulting in a product which is bound to give satisfaction in service.

Copeland offers a wide variety of sizes. 21 distinct models ranging from 100 lbs. to 3,250 lbs. I.M.E. per 24 hours, 1/6 to 3 H.P., 1, 2, and 3 cylinder compressors, air and water-cooled.

A new booklet descriptive of the Copeland Commercial line is now available. Copies will be sent upon request.

COPELAND REFRIGERATION CORP., Mount Clemens, Mich.

Copeland

DEPENDABLE Electric REFRIGERATION

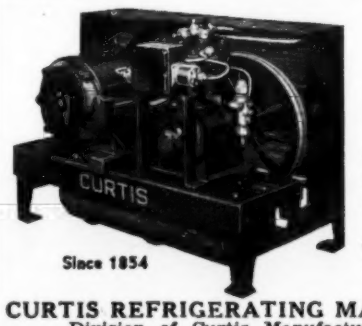
Keep your refrigerator up to date by using the latest model

RANCO THERMOSTATS

with

1. Semi-automatic FAST FREEZE.
2. Semi-automatic DEFROST.
3. ECONOMY RANGE for vacation week ends.
4. Most dependable OVERLOAD MECHANISM.
5. TRIP-FREE overload.

THE AUTOMATIC RECLOSING CIRCUIT BREAKER COMPANY
1300-10 Indianola Avenue, Columbus, Ohio



CURTIS REFRIGERATION

Quiet, Compact, Slow Speed Condensing Units. Complete range of sizes for commercial and domestic applications. 1/6 h.p. to 5 h.p. Distributor Franchises still available.

Write to

CURTIS REFRIGERATING MACHINE CO.
Division of Curtis Manufacturing Co.
1912 Kienlen Avenue, St. Louis, U.S.A. 512 H Hudson Terminal, New York City.

INSTALLATIONS

Frigidaire Branch Installs 94 Tons of Equipment

KANSAS CITY—Ninety-four tons of air conditioning have been installed by the Kansas City branch of Frigidaire Corp. since the first of this year, according to M. V. Lyle, manager of the air-conditioning department.

A 7½-ton system, using concealed ducts, was installed for Chasnoff, Inc., exclusive ladies-wear shop which opened here in March. In Martin's Cafeteria was installed a 20-ton system, and another 20-ton conditioner was purchased for Martin's tavern, adjoining the cafeteria. Both establishments have ducts for circulation of the air.

Frigidaire equipment with 13 tons of capacity was placed in the Italian Gardens, downtown restaurant, where ducts are also used, and a 4-ton system using suspended cooling units was installed in general offices of the Universal Institute, correspondence school. A 1-ton job was bought by a local bookstore.

In Omaha, where the Kansas City Frigidaire branch also operates, a 10-ton air conditioner was placed in the Brailey & Dorrance funeral home. The system serves two rooms there. It cools the chapel through ducts when that room is in use, but can be switched to condition the casket display room through several cooling units.

Another Omaha installation just completed is that of 13 tons in the mixing room of the F & F Coughdrop Co. Air is brought into the room through ductwork. In addition to these installations, the Frigidaire outlet has equipped six Kansas City residences with air conditioners averaging 1 ton each.

Ten men are being employed in the branch's air-conditioning department. C. A. Flarsheim is district engineer, Frank Rice has charge of metropolitan sales, and P. K Avery, manager of the entire branch, is devoting much of his time to air-conditioning promotion this season, Mr. Lyle said.

'Wonder Bar' Cooled By Universal Cooler

DETROIT—The "Wonder Bar," Detroit's latest dispensary of fancy liquors, has just been equipped with air conditioning equipment by the Conditioned Air Corp. Universal Cooler compressors are used in the installation.

The "Wonder Bar," located on Washington Boulevard, has three rooms—the main drinking salon, the cocktail room, and the lounge. Each room has its own complete air conditioning system.

In the main room, which faces on the street, two Trane suspension-type air conditioning units are placed in recessed spaces with grille fronts over each of the two doors which lead into the establishment. Direct expansion coils, in which Freon is used, cools and dehumidifies the air which is blown through the units by fans located in the rear of the units. A 5-hp. Universal Cooler compressor operates in conjunction with these units.

In each of the other rooms two Airco cabinets, equipped with Trane coils through which Freon is pumped, cool and dehumidify the air. In designing these rooms special recessed wall coves were left for the Airco units.

In these smaller rooms return ducts are provided on the walls near the floor, so that the air is re-circulated.

A 3-hp. Universal Cooler compressor operates in conjunction with each of the Airco units.

In each of the rooms operation of the system is by means of a thermostat which controls a solenoid valve in the liquid line of the refrigeration system.

Detroit Edison Installs Refrigeration System

DETROIT—A Universal Cooler 7½-hp. compressor and a water cooling system have been installed to furnish refrigeration for the air-cooling system in the Farmer St. office of the Detroit Edison Co.

The utility company's offices are cooled by an air-conditioning system in which cold water is pumped through coils over which air is circulated. Ice was used to cool the water last year, being dropped into a big tank through a hole in the sidewalk.

However, the method of cooling the water with ice was found to be too expensive, so the Universal Cooler system was installed. The water is cooled to a temperature of between 40° F. and 45° F.

3 Universal Machines Cool Restaurant

DETROIT—Three Universal Cooler 10-hp. compressors are operating in conjunction with a Conditioned Air Corp. air-conditioning system installed in the French Village, popular downtown Detroit restaurant located in the Majestic building.

Air conditioning is accomplished through a central system, the air being cooled by Trane coils containing Freon. The air is cleaned by filters.

The conditioned air is distributed to the main dining room through ducts in a space above a hung ceiling. This space will be insulated.

An American blower fan with a capacity of 15,000 c.f.m. distributes the air. Outside air is introduced by a damper arrangement on the ratio of 25 per cent of the total volume.

St. Louis Statler Hotel To Air Condition More Rooms

ST. LOUIS—Added air-conditioning equipment for the Statler hotel here will be installed by York Ice Machinery Corp., it was announced recently.

New rooms to be air conditioned include the Cafe Rouge, the Daniel Boone room, and three new private dining rooms.

Auditorium Installs System For Washington University

ST. LOUIS—Guaranteed Heating & Engineering Co. of this city reports installation of an Auditorium air-conditioning system in the Hall of Physics at Washington University here.

The air-conditioning system will be utilized in the laboratory of the research department. Jamieson & Spearl were the architects and A. H. Vigel was the engineer on the installation. American Blower equipment was installed.

G-E Air Conditioning System With 20-hp. Unit Installed in Night Club

DETROIT—The Air Conditioning Corp. of Detroit, distributor for General Electric air-conditioning equipment, has recently installed an air-conditioning system for the Merry-Go-Round restaurant and night club at 8740 Joseph Campau St. here. The system provides cooled, dehumidified, and filtered air to the main dining room by means of a concealed duct system.

The central cooling system is made up of a 30-in. wheel blower driven by a 1½-hp. General Electric motor and distributing air at the rate of 7,500 c.f.m., a solid bank of continuous fin cooling coils with nine expansion valves, an especially designed manifold, and washable glass filters.

Refrigeration for this installation is supplied by a 20-hp. G-E compressor with a new shell-and-tube type condenser mounted as a complete single unit on a welded steel chassis.

A feature of the installation is that a portion of the total air supplied is fresh air in the same quantity as air is exhausted to the outside from the dining room by a system of propeller-type fans. The amount of fresh air brought in is controlled by a damper in the return duct and a plenum chamber is used for mixing the fresh and re-circulated air.

Distribution system consists of two main supply ducts with eight low velocity grilled outlets distributed along the walls and two high velocity outlets directing air the length of the building.

Air is exhausted to the outside by two separately located fans. Return air is brought back to the air conditioner by a duct carried underneath a raised platform. All duct work is concealed in the dining room, giving the appearance of beam construction.

Temperature control and operation of the refrigeration system is by means of thermostatic expansion valves.

The entire central cooling unit was completely installed in a small basement room and connected to supply and return ducts brought from the first floor.

Air Conditioning Corp. of Detroit is also installing equipment which will make the system a year 'round conditioner.

Even the most delicate fur is safe when

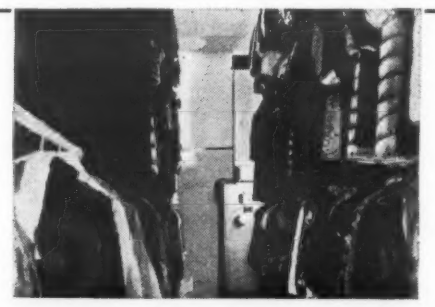
"FREON"

is the refrigerant

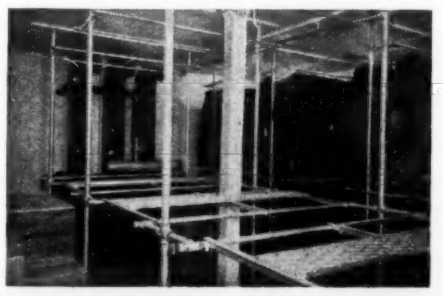
KAUFMAN'S DEPARTMENT STORE, *Pittsburgh, Pa., Air-conditioned with "Freon" by Frigidaire*

WHEN a customer leaves a valuable fur with a furrier for storage, the furrier guarantees its return undamaged by moths or refrigeration—in perfect condition and free of odor.

Today, many managers of fur vaults protect themselves and their customers by using "Freon." This refrigerant is safe, non-toxic, non-flammable. If "Freon" should escape because of a puncture in the evaporator, it would not harm the dyestuffs of the fur, or cause the hair to loosen from pelts. "Freon" has no odor to cling about furs and render them obnoxious to customers. In modern "Freon" air-conditioned fur vaults the air is *circulated*, re-creating the cold conditions under which the animal developed its winter coat.



FUR STORAGE VAULT. *"Freon" refrigeration equipment by York Ice Machinery Corporation.*



Storage of aviation coats at DUNCAN AVIATION FIELD. *"Freon" refrigeration by York.*

The furriers of your city are prospective users of "Freon." Why not point out the outstanding qualities of this refrigerant to them? And there are other prospective customers. For "Freon" is the preferred refrigerant for comfort cooling in hotels, theatres, restaurants, apartments—and for refrigeration and air-conditioning in meat markets, delicatessens, florists' and photographers' shops, museums, and countless other places.

FREON

REG. U. S. PAT. OFF.

a safe refrigerant

KINETIC

KINETIC CHEMICALS, INC., TENTH & MARKET STREETS, WILMINGTON, DELAWARE

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EDITORIAL AIMS

To encourage the development of the art.
To promote ethical practices in the business.
To foster friendly relations throughout the industry.
To provide a clearing house for new methods and ideas.
To broadcast the technical, commercial, and personal news of the field.

VOL. 12, NO. 6, SERIAL NO. 272, JUNE 6, 1934

A New Approach

DEPARTMENT STORES, which have become increasingly important to the refrigeration industry, have observed that refrigerators are becoming increasingly important to them. And along with this observation has come the realization that the business of selling refrigerators has a technique radically different from that they have employed so long and so successfully in selling other types of merchandise.

This realization may lead to an entirely new approach—not only to the sale of electric refrigerators—but to the merchandising of all household appliances. A brand of thinking that is tending in this direction was revealed last week in Cleveland at the Second Merchandising Clinic for leading department store executives, sponsored by the refrigeration department of the General Electric Co.

Appliances Not Like Textiles

The department store business was built originally on the merchandising of textiles—on which price appeal is the basis of sale. When department stores began to take on refrigerators, they pursued the same policy, and followed the same formula. The big idea was to buy a job lot of boxes at a special discount, mark down the price, and move them all quickly in a special sale.

This practice involved private brands, cheap refrigerators made by unresponsible manufacturers, outdated models, "seconds," and inferior jobs. All this, of course, led to trouble.

Yet the demand for refrigerators held up, and increased. And gradually department stores began to realize that here was a different kind of merchandise, one which called for a *new approach*. Refrigerators, they are commencing to believe, should be sold for *what they will do*, and not on what *they cost*. Too, they are deciding that specialty merchandise requires specialty methods and specialty men.

Specialty Merchandise, Methods, Men

Specialty methods are leading them to seek—and stick to—franchises for nationally known refrigerators made by reputable manufacturers. They are conscious of price competition from chain store groups, like Sears Roebuck, Montgomery Ward, and Wurlitzer; but rather than set up a new manufacturer to make refrigerators at prices which might compete with the chain stores—as they might have done once, and as they occasionally do in other lines—they are inducing established manufacturers to supply them with low-priced lines. And to a relatively high-priced line like Westinghouse, they are adding low-priced lines like Crosley.

(Here is a spot where one specialty method will probably not be employed by department stores: they will not take just one line and keep it. A fundamental of department store selling is that the store should offer a *variety* of merchandise.)

With the signing of franchises for nationally known makes of refrigerators comes the assumption of obligations to tie in with home-office-planned promotional campaigns and merchandising programs. The enfranchised department stores thus become users of the very latest and most highly developed specialty selling *methods* yet devised.

Specialty *merchandise* having been acquired, and specialty *methods* subscribed to, the department store's next step is to gather together an organization of specialty *men*. In some cases these specialty salesmen have been supplied by the distributor. But this plan hasn't always worked out so well for the general good of the department store. Cat-and-dog fights often develop, it turns out, between rival salesmen who, if they cannot get the order themselves, frequently try to prevent a competitor *in the same store* from getting it.

Salesmen Concentrate on One Appliance

Nor has the scheme of trying to train one man to sell several appliances worked out well in many department stores. Most salesmen, department store executives testify, just aren't "built that way." Moreover, they will nearly always neglect one appliance to favor another. Trying to get a salesman off the lucrative business of selling refrigerators and onto the stiffer job of selling washing machines, for instance, is sometimes a tough proposition.

Good sales training is, of course, the answer to this problem. General Electric points out that several of its large metropolitan retail operations have been successfully training salesmen to sell their entire line of household appliances. But department stores find they are rarely able to train their men sufficiently for such a complex task. They learn just enough about each product to arouse interest in the prospect's mind, but just can't seem to close the deal. Specialists in each line have to do that. Getting good specialty salesmen, then, is a major dilemma with department stores now.

Specialty Selling Entirely Approved

Naturally problems like those outlined above will come up in connection with adapting the specialty selling formula to department stores. But it is interesting to note that no longer does there seem to be any argument regarding whether or not department stores *should* employ specialty salesmanship on electric refrigerators and other household appliances. That seems to be taken for granted this year, for the first time. Today all the discussion settles down on *how* it can be done, rather than *why* it should be.

Department stores have discovered that specialty dealers not only get the cream of the business on each appliance—which the big outlets miss because they wait for the products to become demand merchandise—but that they stay in business and make money so long as there is a market for the items they sell.

Emphasis Changed from Buying to Selling

Impressed, department stores are taking leaves from the specialty dealer's book. They are learning that sporadic campaigns and special sales are not the only ways to move merchandise of this type. They are learning that price is not the only appeal. And they are seeing that, once they are willing to abandon their old merchandising formulae and substitute newer ones better adapted to specialty items, they can make real profits—even though these *actual* profits may fade away under the weight of heavy capital, rent, and management charges imposed by the department stores' antiquated bookkeeping systems.

Put briefly, the emphasis in department stores' merchandising policy has shifted from *buying* to *selling*. As a result, close observers in the industry are predicting that department stores should sell close to 400,000 household electric refrigerators in 1934.

LETTERS

Code Administration for Refrigerator Retailers

Local Retail Code Authority
City of Port Huron and Trading Area
Port Huron, Mich.

Editor.

We have been asked to take up with you relative to information which you have in connection with the operation of the Retailers Code which would apply to merchants selling refrigerators.

It is our understanding that code organizations for this purpose have been organized in different cities in the state and we would like to form such an organization so that our merchants who handle refrigerators might have a better understanding with each other and they would not be continually crossing wires.

J. L. LUDLOW, Secretary.

Editor's Note: ELECTRIC REFRIGERATION NEWS has published no information concerning the method of organizing a setup for the purpose of administering or applying the Retail Code to retailers of household electric refrigerators.

Detroit dealers to whom we have talked do not know of any particular organization set up for that purpose. About all they know of the Retail Code administration is that an attempt has been made (by mail) to assess them for the cost of operating the local code authority.

However, we have published a number of stories concerning the drafting of a local code of fair competition for refrigeration dealers. Typical of this sort of activity is that inaugurated by Saginaw, Mich., dealers which was reported in the April 18 issue.

The fair practice provisions (as far as electrical appliance dealers are concerned) of the Retail Code are practically without meaning, so broad are their terms, and thus there seems to be little need for an administrative setup.

Concerning Proposed Retail Code Changes

Bankers-Commercial Security Co., Inc.
270 Madison Ave. at 39th St.
New York City

Editor:

In your May 9 issue on the editorial page, you published a release from Washington headed "Changes in Retailing Code Would Affect Instalment Selling" and quoted a proposed amendment to the retail code.

Printers' Ink, which is usually very reliable, printed the same despatch which, however, did not have the sanction of the Retail Code Authority.

We investigated this matter very carefully as the president of this company is also one of the two owners of *Printers' Ink* and discovered that the despatch from Washington was not authentic and the retail code authority disclaims any responsibility for these proposed amendments.

Apparently the authors of these suggestions secured its release in some irregular fashion. *Printers' Ink* have made a correction in their issue of May 17, and I thought possibly you might like to do the same as the original article possibly gave some of your customers a concern that is not justified by the facts.

W. LEE WHITE, Treasurer.

Editor's Note: The story published in ELECTRIC REFRIGERATION NEWS clearly stated that the measures were mere "proposals," but it credits them to the Retail Code Authority, which was an error, as the Retail Code Authority has disclaimed any responsibility for the proposed amendments covering instalment buying which were introduced in the hearing.

Because the amendments were inserted in the agenda prepared for the meeting without approval, the Retail Code Authority insisted that they be given no consideration at the hearing. Later developments revealed that the Consumers' Advisory Board was responsible for them.

Refrigeration Service As a Career

2512 Ohio Street
Michigan City, Ind.

Editor:

I have received your interesting weekly for sometime and can truthfully say that you are to be congratulated on the complete way you cover the industry as well as the manner in which it is written.

One of the departments in wh'ch I am interested is the letter department. These are very interesting. It was while reading in this section of the paper that I thought you might help me out with an uncertainty of mine. Briefly it is this: I am interested in locating in the refrigeration industry as a service man. In regard to this I would like to have your opinion on the following questions:

1. Is the demand for service men as large as it is quoted to be?

I have been told that there are great opportunities in this line and would like to know for sure from some disinterested party.

2. What is the average pay for a service man?

If you will help me out by answering these questions I will be very much obliged as it means a good deal to me.

EARL KILLINGBECK.

Answer: It is hard to answer your first question as to whether the demand for service men is "as large as it is quoted to be," since we do not know whose statements on this subject you are referring to. Also, we have collected no figures regarding the average pay for service men.

We feel confident that there is a good field for trained refrigeration men looking at the opportunity broadly and over a long range. This is true because of the continued rapid progress of the industry indicated by sales of over one million new units each year and the apparent potential market for air conditioning.

These general conditions, however, do not guarantee anything for a particular individual in a particular locality. It is very difficult to give good advice to anyone on this subject. A great deal depends upon your own qualifications and ambition.

Dry Ice Patents

201 College Ave., Benton, Ill.

Editor:

I once saw in ELECTRIC REFRIGERATION NEWS, a list and illustrations of patents on refrigeration systems. I would like to obtain a list of patents based on the principle of dry ice.

If you have a list of this kind that I can purchase, or if you can tell me where to get it, I will greatly appreciate your reply.

LESLIE O. JONES.

Answer: All patents issued which are classified by the Patent Office under refrigeration and related subjects are published regularly in the weekly issues of ELECTRIC REFRIGERATION NEWS. We have been publishing this information for about seven years and in the early issues of the NEWS we listed all refrigeration patents on record.

It would be necessary for you to obtain the services of a patent attorney to obtain a list of all patents needing a particular description, such as those using dry ice.

H. R. Van Deventer, 342 Madison Ave., New York, N. Y., is a patent attorney who specializes in refrigeration. His company maintains a very elaborate file of refrigeration patent data and may be able to furnish you the desired information.

You've Got Us All Wrong, Pal

Brunswick Music Shop
Norton, Va.
June 1, 1934.

Editor:

It is so noticeable that on page 11 of May 30 NEWS you listed in "Index" names of refrigerators in alphabetical order but when you listed the specifications you did not make that alphabetical. One wonders why? Is it because of a lack of brains or for the lack of fairness. It does appear that you show favor occasionally. But then it is said "Every man does have his price," and I guess you, being human, are no exception.

A. C. MCCLURE.

Editor's Note: It's obvious that Reader McClure has never tried to "make up" a newspaper. It's an axiom of the printing trade that "type isn't made of rubber"—it can't be stretched or squeezed into a place it won't fit just because you want it there.

Specifications were placed in spots *where they would fit*. Just for fun—and in case you still think favoritism was shown—get out your scissors and paste and try to rearrange those specifications alphabetically.

Far from being bribed by manufacturers we had to cajole, beg, and threaten them. Some manufacturers are not at all keen about having their specifications spotlighted and compared so publicly.

More Intimate News

Frigidaire Corp.
Dayton, Ohio

Editor:

That candid camera idea of yours is a most excellent one, and makes the news even more intimate. You are doing a very fine job.

W. D. MCELHINNY.
Manager, commercial division.

Can't Get Along Without Us

Mueller Lumber Co.
Davenport, Iowa

Editor:

I am with the above firm traveling on Kelvinator. Please enter my subscription for one year on REFRIGERATION NEWS. Have been away from refrigeration for over a year, but now that I am back I can't get along without REFRIGERATION NEWS.

C. E. PLUMLY,
616 S. Iowa Ave., Washington, Iowa.

NEW EQUIPMENT

Savage Arms Makes Year 'Round System

UTICA, N. Y.—Just introduced by the air-conditioning division of Savage Arms Corp. is a new "Zephyr" self-contained air conditioner which cools, heats, dehumidifies, humidifies, and recirculates the air in the conditioned space.

For cooling, the conditioning cabinet is equipped with a 2-cylinder water-cooled compressor with a capacity of 7,500 to 9,000 B.t.u.'s per hour. Cooling is accomplished by blowing the air over direct expansion coils. Where cold tap water is available at a temperature between 40° F. and 48° F. cooling may be accomplished by a flow of cold water through the cooling coil. The cooling coil also acts as a dehumidifier.

All air circulated to the room is washed in a dense spray of pure water *before* the cooling process. Thus, in the winter time, when the cooling part of the system is not in operation, this spray also acts as a humidifier, evaporating from 4 to 16 gal. of water per day, depending on the temperature of the spray water.

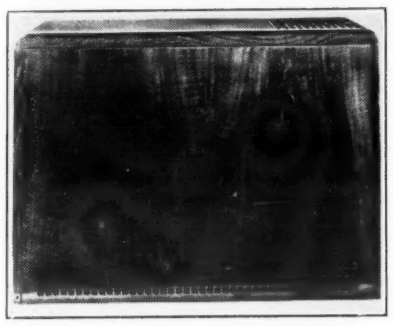
Consumption of the spray water device is 10-gal. per hour. Where a large space is to be humidified, spray water is tempered with a shell-type indirect heater attached to a heating boiler.

Condenser water is supplied from a ⅜-in. spray water supply connection. Consumption averages 40 to 50 gal. of water per hour when the refrigerating unit is operating. A ¾-in. connection provides waste for both air washer and condenser.

The heating function is provided on order only, a copper-finned heating core, placed directly below the air discharge opening, being supplied where requested. Heating capacity is the equivalent of 40 sq. ft. of cast iron radiation.

Air is drawn into this "Zephyr" conditioner through a grille on the side of the cabinet near the floor level at the rate of 250 c.f.m. and is discharged from the top of the unit at an angle of 30° from vertical.

'Zephyr' Conditioner



Air is drawn in at the bottom and distributed from the top.

Cabinet-Type Cooler Is Introduced by Lipman

BELOIT, Wis.—A new cabinet-type air conditioner operating in conjunction with a 1-ton Lipman refrigerating machine and the Lipman 10- and 15-ton railway air-conditioning compressors now available for all commercial air-conditioning applications, were exhibited by General Refrigeration Sales Co. at the air-conditioning show held recently in Chicago by the Commonwealth Edison Co.

General Refrigeration's air conditioner is a floor-type combination unit for cooling, filtering, dehumidifying, and circulating air in summer, and heating, freshening, filtering, humidifying, and circulating air in the winter.

Recirculated air is drawn into the conditioner through a grille at the bottom of the unit. Fresh air from the outside is drawn in through a louvred opening at the back of the cabinet, and is mixed with the recirculated air in a predetermined percentage. The amount of fresh air admitted is controlled by a manually adjusted damper located inside the cabinet so that the adjustment may not be casually changed.

Cooling and dehumidifying is accomplished by passing the air over direct expansion refrigeration coils, Freon being the refrigerant used. The unit will accomplish 20° F. cooling with a 1-ton Lipman compressor, it is claimed.

Humidifying is accomplished in winter operation through two spray nozzles located in the bottom of the cabinet.

The 10- and 15-ton Freon refrigerating units, which heretofore have been produced solely for railway air-conditioning applications, are powered by 10- and 15-hp. motors, respectively.

The compressor, which is the same on both models, has four cylinders with a 3¼-hp. bore by a 4-in. stroke. The counter-balanced shaft is exceptionally rigid, with oversize bearings.

Suction and discharge valves are of the disc type, with large ports and low lifts, and are contained in an easily replaceable valve plate.

A high oil level is carried in the crankcase, submerging the crankshaft bearings and assuring good lubrication. This high oil level also causes the crankcase seal to operate submerged in a moving current of oil, and when the compressor is idle, the seal face is covered with oil. The seal is of the bellows type, especially adapted to the high crankcase pressures encountered on air-conditioning work.

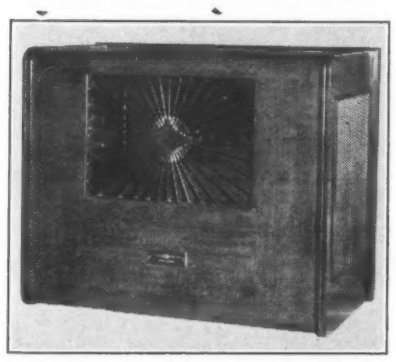
Lubrication is by the splash system. Oil return to the crankcase is effected by means of a special oil return valve, which permits oil to enter the crankcase from the suction line while the machine is operating, but which also prevents the oil from foaming out of the crankcase when the machine starts up.

The condenser is of the counter current type with multiple copper water tubes inside of the refrigerant pass. The water flowing counter current to the refrigerant flow removes superheat with warm water.

Compressor, condenser, and motor are mounted on a cast iron base which contains the receiver.

Deep fan spokes with flared rims, cast integral with the flywheel, move considerable air for compressor cooling.

New G-E Wall Unit



This new General Electric comfort-cooling unit is designed for a direct expansion system.

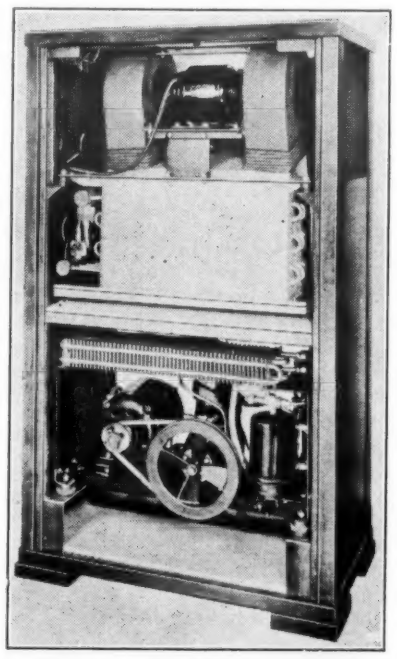
'Mickey Mouse' Lives In Air Cooled Studio!

LOS ANGELES—An air-conditioning system capable of maintaining a 15° F. temperature differential between outside and inside temperature conditions is to be installed in a new studio for Walt Disney Productions, Ltd., which produces "Mickey Mouse" animated cartoons and the famed "Silly Symphonies."

Peterson Leaves Automatic Products Co.

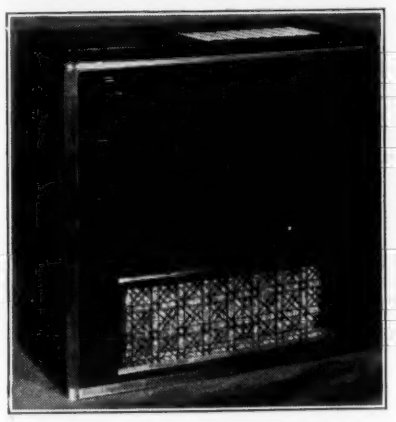
MILWAUKEE—Arnold E. Petersen has resigned as sales manager of the Automatic Products Co. of this city, manufacturer of refrigeration valves and humidity regulators, according to an announcement made last week.

The 'Inner Workings'

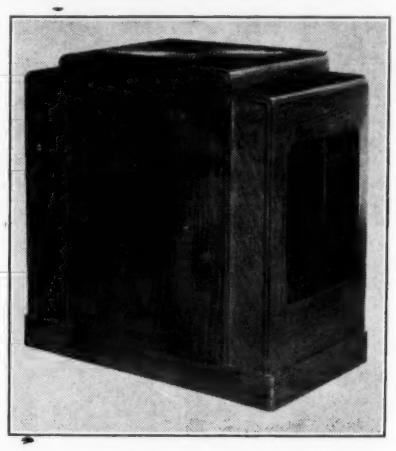


Rear view of Kelvinator's self-contained unit showing the compressor, cooling coils, and blowers.

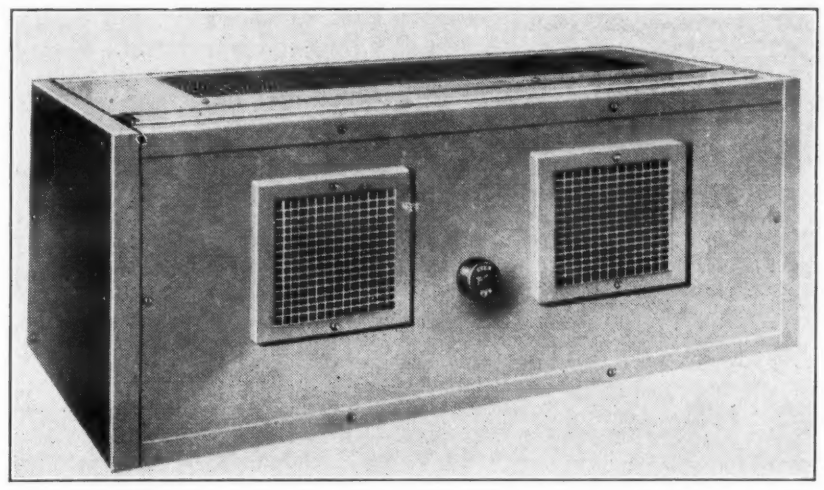
New Air Conditioners



York has just introduced this year 'round conditioning cabinet.



In a 'different' design is this new General Electric room cooler.



Kelvinator has recently developed suspended-type air-conditioning units, in the design pictured above, which are available in 12 models.

Humidity Indicator Gives Direct Reading

CHICAGO—Just introduced by Fee & Stemwedel, Inc., of this city is the Airguide humidity indicator, which reads per cent relative humidity directly, and which is designed for use in stores, factories, or warehouses where knowledge of humidity is of importance in the handling of commodities.

The indicator operates on an absorption principle, that is, the humidity sensitive element is directly affected by the relative humidity of the atmosphere in which it is located. This element is a moisture sensitive spiral which winds or unwinds with changes in relative humidity. This motion is transmitted to the indicator hand so that the position of this hand on the scale shows directly, without figuring or calculating, the relative humidity of the air.

The Airguide humidity indicator is designed for wall mounting and is provided with a mounting hole in the back of the case. Installation directions point out that the indicator should be placed where it will receive the maximum amount of air circulation possible, for while under normal conditions the accuracy of the reading does not depend upon air circulation, the rapidity with which the instrument will be affected by changes in relative humidity does depend on air motion.

Provision is made for external means of adjustment. This consists of a flat lever, access to which may be had through six slots perforated in the back of the case to form a circle.

Dimensions of the Airguide humidity indicator are 4⅝ in. in diameter by 1½ in. deep. Case and back are heavy stamped metal, with chromium bezel, convex glass crystal, cream colored metal dial with large black figures, and black indicating hand.

The dependable performance which Universal Cooler units provide is a matter of open record. And this record extends back over a period of ten years. The test of time furnishes an accurate gauge of true quality.

UNIVERSAL COOLER CORPORATION
DETROIT, MICHIGAN BRANTFORD, ONTARIO

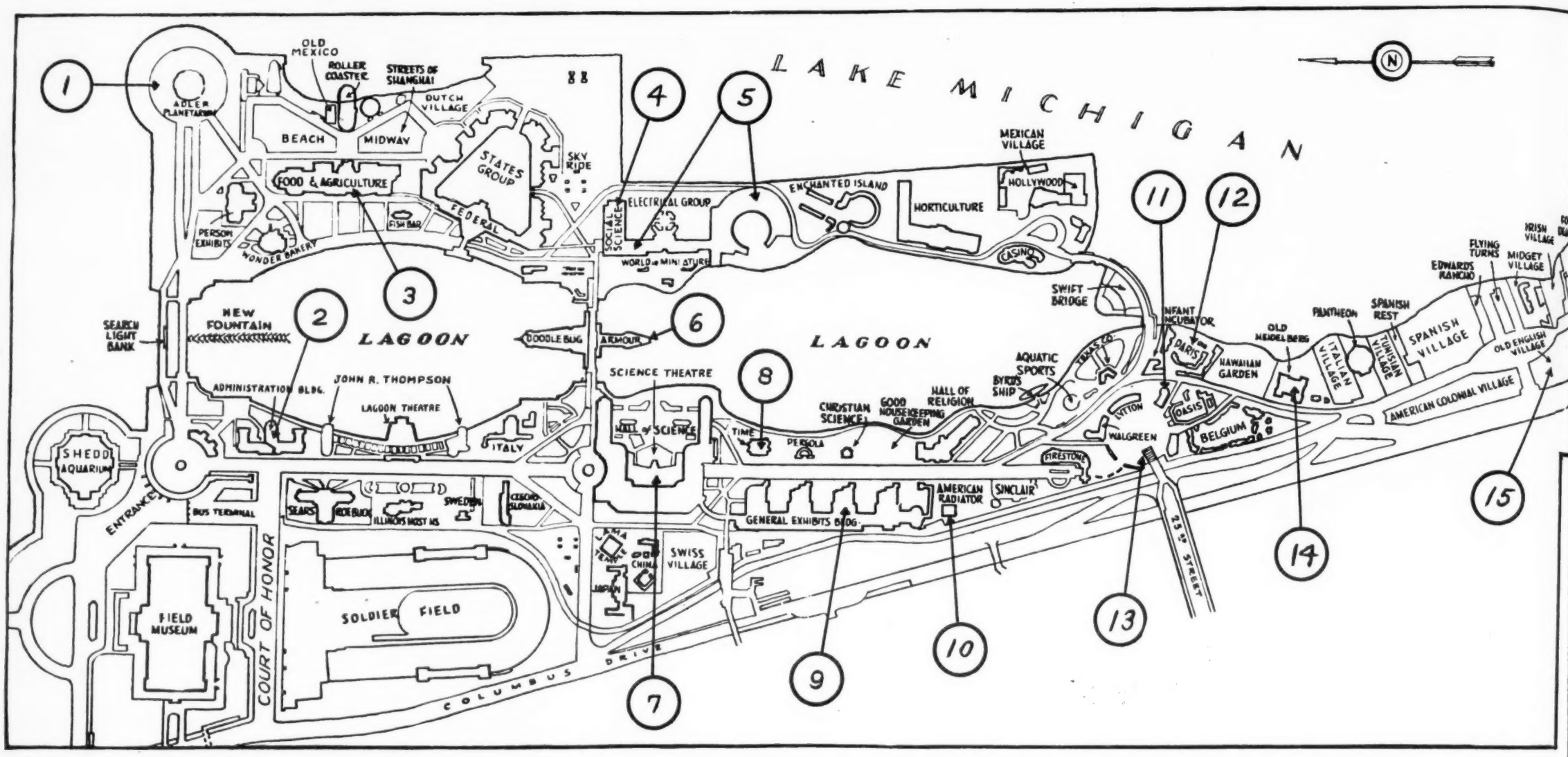
MANUFACTURERS OF A COMPLETE LINE OF HOUSEHOLD AND COMMERCIAL REFRIGERATION EQUIPMENT

Where Air Conditioning Is Installed at A Cent

KEY: Numbered circles in the map show those buildings in which air conditioning was operating or being installed last week. Immediately to the right begins a key to the map. The numbers in parentheses give names of buildings.

The figures following each building name in the key indicate the number of tons of refrigeration employed there for air conditioning. Where several exhibits in a building are air conditioned, names of the exhibits are given in parentheses.

(1) Adler Planetarium 70
(2) Administration Building 4
(Rufus Dawes' Office and Major Lenox R. Lohr's Office)
(3) Food and Agriculture Building..... 5½
(Kraft Cheese Exhibit)
(4) Hall of Social Science..... 2½
(Household Finance Corp.)
(5) Electrical Building 95
(American Telephone & Telegraph, Central States Exhibit, Electrical Florist Shop, Electrical Industry Exhibit, General Electric "House of Magic," Kelvinator Theater, Leonard Theater, Singer Sewing Machine Exhibit, and Westinghouse Theater)
(6) Armour Exhibit 4
(7) Hall of Science 126
(Mallinchrodt Chemical Works, Triangle Restaurant, and Union Carbide & Carbon)
(8) Time and Fortune Building .....
(9) General Exhibits Group .....
(A. B. Dick & Co. Mimeographing
(10) American Radiator Building .....
(11) General Cigar Co. .....
(12) Streets of Paris (Private Office)...
(13) Mrs. Snyder's Candy Shop .....
(14) Old Heidelberg Inn .....
(15) Old English Village .....
(16) Black Forest Village .....



Comforts of Air Conditioning Dramatized On Hot Days at A Century of Progress

(*Concluded from Page 1, Column 5*)

stalled by Westerlin & Campbell Co., Chicago agents for York. This is a Freon system, and circulates 30,000 cu. ft. of air per minute.

A pair of new restaurant installations are two restaurants in the Old English Village which was added to the Fair this year. These were installed by Midwest Engineering Co., and employ three 15-hp. Frick-Universal condensing units producing 38 tons of refrigeration per day in direct expansion Trane cooling coils.

All told, 18 Detroit Lubricator thermostatic expansion valves operate with these systems, together with three solenoid valves furnished by Refrigerating Specialties Co. of Chicago to control the Freon refrigerant.

Old Heidelberg Inn, a restaurant specializing in German food and German entertainment, has the same 20-ton air-conditioning system which cooled it last summer. The compressor for this installation is a Vilter rotary, operating with Freon.

Of special interest because carbon dioxide is employed in direct expansion to cool air for the two restaurants—one a cafeteria the other called the Black Forest Inn—in the new German Village is the air-conditioning system installed by the Wittenmeier Machinery Co. of Chicago. Operating on this same system is the ice-skating rink on which fancy skaters perform on schedule throughout the day and evening, see picture below.

The refrigeration system includes two horizontal carbon dioxide compressors, one driven by a 40-hp. G-E motor, the other by a 50-hp. G-E motor. Both have two-speed controls so that the motor speeds can be changed to suit the requirements of either the air-conditioning system or the ice-skating rink (the machines are interconnected so that either can help the other on a heavy load).

The two compressors (driven with V-belts by the motors), the shell-and-tube seven-pass water-cooled condenser, pressure gauges, valves, and controls are installed in a refrigeration machinery room which visitors may inspect if they are interested.

Estimated air-conditioning load of the two restaurants in the German Village is 51 tons of refrigeration. The cooling system includes 3,200 sq. ft. of finned surface steel coils, built by Wittenmeier to withstand pressures in the 300-lb. range at which carbon dioxide works. Restaurant walls are insulated with a 1-in. thickness of Thermocell.

Refrigeration load on the 32 by 48-ft. ice-skating rink is 40 tons per day. The 1½-in. thickness of ice is produced by electrically welded seamless steel coils, refrigerant for which is all controlled by four expansion valves. Refrigeration is served by direct expansion, rather than by the brine method which is ordinarily used in ice rinks.

Ice temperatures are measured by a long-range thermometer of the Illinois Testing Laboratories. When temperature of the ice rises to 28° F., the operator starts the compressor.

Condensing water flow is regulated by Minneapolis-Honeywell electric water valves—water economy is an important consideration in view of the fact that the Fair management measures the water consumption.

Base of the skating rink is of concrete, on which 4 in. of compressed cork insulation was laid. Between skating performances, a table moves over and covers the ice surface. This table serves as a dance floor for patrons of the Black Forest, and also to preserve refrigeration effect in the ice for it seals against sides of the rink and has a 6-in. thickness of Porosil insulation—a granulated silicaceous insulation made by Vermiculite Products Co.

Four times a day the ice surface is sprinkled with water which fills up cracks and freezes. Last Thursday when outdoor temperatures in Chicago were between 100° and 105° F., the professional skaters reported that the ice was perfectly hard, although it became wetted soon after each performance started from condensation of humidity in the air.

Architectural design of the German Village similates a village in the Black Forest country of Germany. Buildings are covered with (washable) artificial snow, and from all the eaves are suspended glass icicles which produce a decidedly wintery effect.

Of the several small theaters scattered throughout the Fair, most are air conditioned. The only one not so equipped is the Globe Theater in the Old English Village where Shakespearian plays are presented, and this institution's manager told the NEWS reporter that air conditioning is under advisement.

Advertised as "the smallest theater in the world" is the 26-seat house operated by the Household Finance Corp. in the Hall of Social Science, see picture on this page. Here this company's suggestions on family financing are depicted throughout the day with movie films featuring Edgar A. Guest. It is conditioned by a 2½-ton Ilg condensing unit serving two ceiling type units which project cooled air through ducts at the ceiling.

One of the largest theaters on the grounds is that in the General Motors building. A 300-seat auditorium, this room is conditioned by 34 tons of Frigidaire refrigeration installed in the basement below.

Conditioned air is introduced through 12 grilles located along the two side walls of the rooms, the cooling coils being located in the ducts without the theater itself. Return air ducts are concealed above the lighting fixtures. New air is introduced continually to keep the auditorium's atmosphere fresh. Two dressing rooms and the foyer of the G-M theater are cooled by ducts and also by Frigidaire floor-type cabinets recessed in the walls.

A popular part of the new Ford exposition is the Ford theater, air conditioned by York equipment installed by Westerlin & Campbell, Chicago agents. This employs a York 32-ton compressor, driven by a 40-hp. motor, and serving Freon refrigerant in direct expansion to copper-tube and aluminum-fin York coils in a central station air-conditioning system with automatic control. Part of the air is recirculated, part is fresh air drawn from outdoors.

To demonstrate home electrification dramatically, Westinghouse is preparing a 150-seat theater in its mammoth exhibit in the Electrical building.

Center of the theater will be a circular revolving stage, 28 ft. in diameter, with six different scenes, and five set-ups of modern home equipment. From these an actress will stage 30 shows daily, moving from one to the next as the stage revolves.

Cooling the theater is one of the new Westinghouse six-cylinder, 12-ton refrigerating machines operating with two 6-ton overhead-type cooling units. Half of the air introduced is recirculated. The system was started up last Thursday when outdoor temperatures rose to 100° F., and according to Westinghouse engineers, a temperature of 72° F. was reached inside.

General Electric's House of Magic, seating 300 people, in which new scientific developments of the electrical industry are shown, is air conditioned with the G-E *indirect* cooling system installed last spring. This includes 10 3-hp. G-E Freon condensing units each connected to a model M-150-R Filtrine water-cooling tank from which cold water is pumped to cooling units serving conditioned air to the theater.

The control system on the G-E installation is arranged so that only as many compressors need be started up as current conditions require. On full load it is estimated that the system

Three at a Time

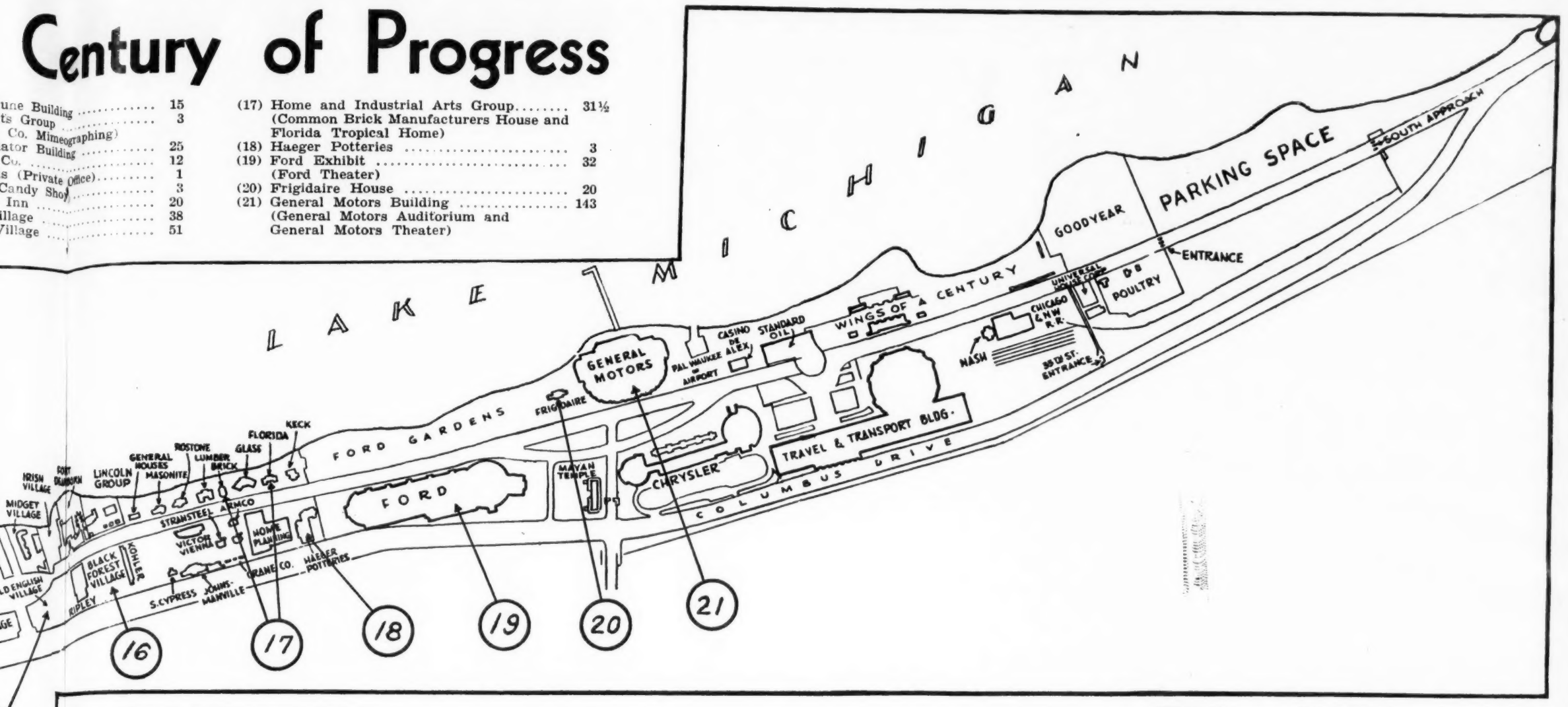
Skater Maguire hurdles three barrels on the ice-skating rink in the Black Forest. A 1½-in. thickness of ice is produced by a Wittenmeier carbon dioxide system operating in direct expansion.

Cool Customers, Firm

Confections in Mrs. Snyder's Candy Shop are kept conditioning system which holds 72° even in the hottes

Century of Progress

une Building	15
ts Group	3
Co. Mimeographing)	
ator Building	25
Co.	12
s (Private Office)	1
Candy Shop	3
Inn	20
illage	38
Village	51
(17) Home and Industrial Arts Group (Common Brick Manufacturers House and Florida Tropical Home)	31½
(18) Haeger Potteries	3
(19) Ford Exhibit (Ford Theater)	32
(20) Frigidaire House	20
(21) General Motors Building (General Motors Auditorium and General Motors Theater)	143



produces about 20 tons of refrigeration per day.

General Electric, Kelvinator, and Westinghouse are all showing air-conditioning equipment in their product display exhibits. G-E features its year 'round equipment (room coolers, winter humidifiers, gas and oil furnaces, and year 'round systems). Kelvinator will show several room coolers and condensing units in its exhibit of commercial refrigeration equipment.

Westinghouse has several of its self-contained Mobilaire room coolers, commercial condensing units, and a 6-ton machine operating a 6-ton suspended-type cooling unit in its exhibit.

Kelvinator's exhibit is still incomplete, but will include the complete line of household and commercial refrigeration in addition to a 125-seat theater showing marionettes. This will be cooled by two of Kelvinator's largest suspended-type cooling units, served by a 15-hp. Kelvinator compressor installed in the commercial exhibit space for visitors to inspect.

Directly across the aisle is Leonard's 95-seat theater in which sound movies will be shown. The Leonard theater is conditioned by a 10-hp. Kelvinator machine connected to two suspended-type cooling units. Ranging outside this theater is Leonard's line of household refrigerators on display.

Last air-conditioned theater discovered by your reporter is a 200-seat auditorium in the Electrical Industry Exhibit in the Electrical building. The power companies like Commonwealth Edison Co. of Chicago are sponsoring this exhibit to tell the public utility story. It is cooled by Frigidaire air-conditioning equipment with a capacity of 18 tons of refrigeration.

So far as could be learned, only three private offices at A Century of Progress are air conditioned. The office of Rufus Dawes, president of the Fair, is cooled by a 2-ton Westinghouse system, as is that of Major Lohr, the Fair's general manager. Both are in the Administration building.

Air-Conditioning Installations at the Fair Exclusive of Railroad Cars

Location	Tons of Refrigeration	Make
Adler Planetarium	70	Carrier
American Radiator Bldg.	25	Amer. Blower
American Telephone & Telegraph	2	Frigidaire
Armour Exhibit	4	York
Black Forest Restaurants (two)	51	Wittenmeier
Central States Exhibit	5	Kelvinator
Common Brick Manufacturers House	1½	Ilg
Rufus Dawes' Office	2	Westinghouse
A. B. Dick Co. (mimeographing)	3	Carrier
Electrical Florist Shop	1	Kelvinator
Electrical Industry Exhibit	18	Frigidaire
Florida State Exhibit	30	York
Ford Theater	32	York
Frigidaire Air-Conditioned House	20	Frigidaire
General American Tank Car	½	Ilg
General Cigar Co.	12	Wittenmeier
General Electric House of Magic	20	G-E
General Motors Auditorium	100	Wittenmeier
General Motors Theater	43	Frigidaire
Haeger Potteries House	3	Carrier
Household Finance Corp.	2½	Ilg
Kelvinator Theater	15	Kelvinator
Kraft Cheese Exhibit	5½	Ilg
Leonard Theater	10	Kelvinator
Major Lenox R. Lohr's Office	2	Westinghouse
Mallinchrodt Chemical Works	10	Frigidaire
Old English Village Restaurants (two)	38	Frick
Old Heidelberg Inn	20	Vilter
Singer Sewing Machine Exhibit	12	Carrier
Mrs. Snyder's Candy Shop	3	Ilg
Streets of Paris, Private Office	1	Ilg
Time-Fortune Building	15	York
Triangle Restaurant	75	York
Union Carbide & Carbon	41	Kroeschell
Westinghouse Theater	12	Westinghouse
Total Tons of Refrigeration	705	

Note: This tabulation does not include equipment installed and operated **for display purposes only,** as in Frigidaire, General Electric, Kelvinator, and Westinghouse exhibit spaces.

The administrative office of the Streets of Paris is also cooled, this with an Ilg self-contained Spot Cooler of about 1 ton capacity.

Demonstrating complete air conditioning of an entire residence, Frigidaire's air-conditioned house is located just north of the General Motors building. As described in the May 16 issue of ELECTRIC REFRIGERATION NEWS, the house is a modern two-story structure, designed for people of moderate circumstances.

The air-conditioning equipment includes a 3-ton condensing unit for normal loads, 16½ tons of condensing capacity (installed in the garage) to carry the additional load imposed on the system by the many visitors to the house, and Frigidaire self-contained room coolers in the upstairs bedrooms.

Downstairs rooms are cooled by ducts connected to a central station plant in the basement. Upstairs rooms are cooled by various types of room coolers and ducts to demonstrate the different kinds of equipment available. The house is insulated, and provided with double-pane window glass to reduce heat gains from the outside.

A short walk north of the Frigidaire house is the Common Brick House, built to show the uses of common brick on home construction. This is provided with a variety of Ilg air-conditioning equipment—a floor-type room cooler in the dining room (connected to a 1-hp. Ilg compressor), the same equipment for one of the upstairs rooms, one Ilg Spot Cooler (self-contained), Ilg fans in the kitchen and bathroom, and an Ilgattic system for circulating cool n'ght air throughout the house.

The remaining air-conditioning systems at the Fair are operating for a variety of purposes—to preserve cigars, meats, cheese, chemicals, etc., but principally for human comfort.

The Adler Planetarium, for instance, has a Carrier system installed several years ago before the Fair opened. This system produces 70 tons of refrigeration per day with a Carrier centrifugal compressor.

Armour's new building has a display booth in which chipped beef is made by girls working behind a display window. This is cooled by a York "basement type" air conditioner with compressor, motor, controls, cooling coils, etc., all mounted in one cabinet. This system has a rating of 4 tons of refrigeration, and uses Freon.

Mrs. Snyder's Candy Shop on the 18th St. bridge entrance has just installed a 3-ton Ilg system, including an Ilg compressor below in the "basement" of the bridge serving liquid refrigerant for direct expansion in a large overhead unit in the shop itself. See photograph of this installation elsewhere on this page.

Because preservation of chocolates was an important consideration in installing this system, it is adjusted to maintain relatively low temperatures. When the Fair's huge Havoline thermometer registered 94° F. last Thursday afternoon, the temperature in Mrs. Snyder's shop was 72° F. or less, which is a greater indoor-outdoor temperature differential than is ordinarily maintained for comfort alone.

A cool haven for footweary visitors is the air-conditioned Time-Fortune Pavilion where hundreds of magazines and periodicals from all over the world are available for perusal while enjoying the lounge.

This building is cooled from a 30-hp. York Freon condensing unit serving a number of York floor-type air conditioners and a system of ducts designed to harmonize with the interior decorations.

American Radiator and Standard Sanitary Corp. has an operating demonstration of a Decalorator steam ejector refrigeration system installed in its building by American Blower Corp., a subsidiary company. A 25-ton system, this operates on a 100-lb. steam supply from an American Radiator boiler alongside. Air is washed and cooled in a glass-enclosed spray booth, and distributed by ducts to American Blower high-velocity outlets located throughout the structure.

The imposing lobby or auditorium of the General Motors building (where swanky custom-built G-M cars are exhibited) is comfortably cooled by a central air-washer system using 100 tons of Wittenmeier refrigeration—this system was installed in the spring of 1933 before Frigidaire's heavy-duty air-conditioning compressors were available. The G-M theater which was air conditioned shortly thereafter, incidentally, employs the *first three* of Frigidaire's 10-ton compressors to come off the production line in Dayton.

Just installed in the Florist Shop in the Electrical building is a new Kelvinator self-contained room cooler.

Another new job this year is in the Florida State exhibit in the Hall of States which has placed what was formerly its outdoor garden, under glass. Both main hall and new conservatory of Florida's exhibit have been air conditioned by York equipment.

Twelve tons of Wittenmeier refrigeration operate to cool General Cigars' exhibit which includes a building on the 23rd St. Plaza with a small cigar-manufacturing unit and a lounge room.

To preserve both the comfort of patrons and the condition of perishables, an Ilg cooling system is installed in the Kraft Cheese exhibit in the Food building. This employs two Ilg compressors totaling 5 tons of refrigeration, connected to two ceiling-type room coolers, and a self-contained Ilg cooler in the girls' dressing room.

Other applications of air conditioning at the Fair includes 10 tons of Frigidaire refrigeration to cool the Mallinchrodt Chemical Co.'s exhibit in the Hall of Science; 12 tons of Carrier refrigeration in Singer Sewing Machine's display in the Electrical building, an Ilg Spot Cooler producing refrigerated conditions in the General American Tank Car Co.'s refrigerated railroad car; 41 tons of refrigeration installed by the Kroeschell Engineering Co. of Chicago for air conditioning in Union Carbide & Carbon's chemical exhibit in the Hall of Science; etc. etc.

For the complete list with refrigeration tonnages and makes of equipment, as found last week, see the table above. It is likely that some were overlooked, especially installations just put in and not yet operating.

Railroad air conditioning is on the lips of almost everyone visiting the new B & O., Union Pacific, Pullman, and Burlington trains being shown south of the Travel and Transport building. Space does not permit discussion of them here, but they will be described in a subsequent issue of the NEWS. Commercial electric refrigeration at the Fair is another topic worthy of discussion later.

tomers, Firm Candies

ndy Shop are kept firm and attractive by an air-° even in the hottest weather. Customers like it too.

Outside the 'World's Smallest' Theatre

Cooled by Ilg equipment, this 26-seat theater of the Household Finance Corp. is a popular exhibit in the Hall of Social Science.

Giants of Industry Foresee Science Opening the Doors to Glorious Future

Miniature camera snapshots taken at the Sloan dinner for leading industrialists and scientists (see page 1 for other pictures). (1) H. W. Newell, Frigidaire vice president in charge of sales, in sharp profile. (2) We couldn't identify this pair, but we'll wager they're important. (3) W. S. Knudsen, General Motors executive vice president, whispers into the ear of G-M's President Alfred P. Sloan. (4) C. E. Wilson, G-M vice president (left), and President Charles Nash of Nash Motors. (5) Rufus Dawes, Kettering, Sloan.

By G. F. T.

Come In and Cool Off

This being an Air-Conditioning Issue of ELECTRIC REFRIGERATION NEWS, it might be *apropos* to remark that again Chicago seems to be the "hot spot" of the country in regard to air conditioning. The same observation was made in this column last year.

A Century of Progress exposition focusses attention on it. But that isn't all. Walk down State, Wabash, Madison, or Clark streets and notice the hullabaloo over air conditioning in restaurants and shops. Step into any supper club and feel the air. Notice how many offices you visit are air conditioned. Installations in the Windy City appear to outnumber those of any other city in the country. At any rate, they make more *fuss* about them.

On the front page of this issue is a small item recording the fact that Mandel's big department store is now air conditioned. To acquaint Chicago shoppers with this improvement, the store is offering for a time 10 per cent discount off anything bought in its subway stores. Slogans for this advertising campaign include:

"Shop in Perfect Comfort—and Save 10 per cent."

"Headquarters for Air-Cooled COMFORT as Well as Fashion-at-a-Price."

"Come In and Cool Off."

We like that last one. It's about as simple and appealing a slogan for an air-conditioned store as we've ever found.

The Florsheim Shoe Salon for Women, on East Madison St., is advertising: "Florsheim Air-Conditioned Shoes, Sold in an Air-Conditioned Shop."

Patterns of holes punched through these Florsheim shoes apparently make them eligible for the "air-conditioned label."

These are but samples. The whole city seems one big hoopla for air conditioning.

* * *

Sour Note

Sour note in the midst of all the harmony hosannaing air conditioning appeared the other morning in newspapers which carry BRUNO LESSING's syndicated column. Growled Bruno:

"Don't like 'air-conditioned' rooms or trains or artificially-cooled theaters or picture houses. Always get the sniffles from the sudden change in temperature.

"Electric fans are great for ventilation. Air in motion is more wholesome than air that is stagnant.

"It has been proven that the victims of the famous Black Hole of Calcutta would not have perished if they had had an electric fan in the dungeon.

"On the other hand, to have an electric fan blow on your head on a hot day is one of the best ways to contract a neuralgia.

"Why doesn't someone invent a way of air conditioning a city? That would be swell. Excepting for those workers who lived out of town."

Wonder if anybody has told Mr. Lessing that *circulation* of the air is one of the prime fundamentals of air conditioning? If the air is stagnant, it isn't air conditioned.

* * *

Cool Zephyr

While we're on the subject of air conditioning, and before going into the subject of the 1934 World's Fair, we ought to mention the Fair's biggest thrill this far:

The streamlined "Zephyr" train of the Chicago Burlington & Quincy Railroad, which made a record breaking run from Denver to Chicago on the opening day of the 1934 A Century of Progress exposition. This speed marvel is air conditioned throughout, York equipment being used.

The train is now bunked at the Travel and Transport building where it will be on display all summer for Fair visitors.

Zooming out of Denver with 72 passengers aboard, the Zephyr made the non-stop run of 1,015.4 miles to Chicago in 13 hours and 5 minutes, or an average speed of 77.5 miles an hour.

The train reached a top speed of 112.5 miles per hour on a three-mile run shortly after its start and at one time maintained an average of 90 miles an hour over a 93.6-mile course.

Grade crossings, of which there are over 700 on the C. B. & Q. line between Denver and Chicago, were watched over by 6,500 men, including road employes and police, so that there would be no hazards or interference. All freight units were placed on sidings at each center two hours before the Burlington speed marvel passed.

The Zephyr has an operator instead of an engineer. The operator sits in an upholstered chair as he sends the train over the rails.

The Diesel engine which drives the train was manufactured by the Winton Engine Co., a division of General Motors Corp. It burns furnace oil, averaging better than two miles to the gallon. Fuel for the run from Denver to Chicago cost only $22!

Condensers, compressors, fans, and accessory equipment of the air-conditioning system used in the Zephyr were especially designed by York engineers, and were more or less complicated and extremely compact, in view of the small space in which the equipment had to be installed, and the light-weight construction required.

The air-conditioning equipment has been put into the small space between the car floor and the outside finish sheets beneath the car, where the superstructure resembles to a great extent that of a dirigible, with struts running in all directions.

Windows of the train are sealed, the air-conditioning system being so designed that a constant volume of fresh, filtered air is circulated through the train, and all stale air is exhausted from the train.

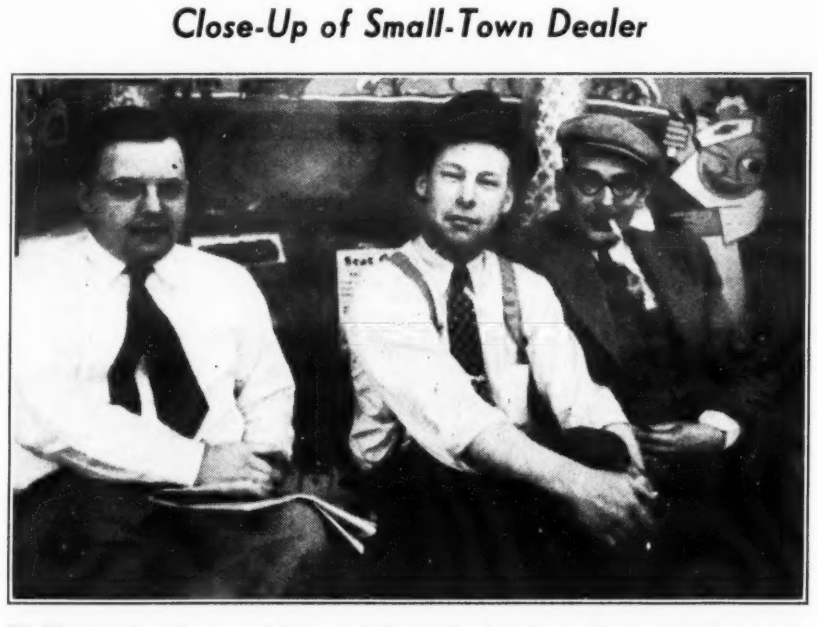
Air distribution is by means of bulkhead delivery. Air ducts of irregular shape are designed to fit compactly into the spaces between each car's structural members. Freon is the system's refrigerant, controlled by thermostatic expansion valves.

* * *

We Take a Bow

We're rather proud of the specimens of Candid Camera Art reproduced in this issue of ELECTRIC REFRIGERATION NEWS—especially those taken at the dinner for leading industrialists given in the General Motors building on A Century of Progress grounds by ALFRED P. SLOAN, Jr., president of General Motors Corp. (see last issue of the NEWS for complete report).

Close-Up of Small-Town Dealer



El Herron has been writing so informatively of small-town dealers that we thought we'd turn our candid camera on one and show the Big City Folk what they look like. This one is Howard Berry (center), Frigidaire and Chevrolet dealer in Union City, Mich. Mr. Berry was sitting outside his garage-showroom at 8:20 p. m. when this photograph was snapped.

While newspaper photographers set up elaborate equipment for taking pictures at this dinner by flashlight—the various personnages posing stiffly for formal portraits—we sauntered through the aisles and casually picked up such unposed, informal, and unsuspecting shots as you see on this page and on page 1—Mr. Knudsen lighting a cigarette, CHARLEY DAWES puffing away at his underslung pipe while DR. MORRIS FISHBEIN beams expansively, Mr. SLOAN cupping his ear to hear better, WALTER PITKIN telling a good one to "DEACON" AYLESWORTH, Mr. KETTERING masticating pensively, Mr. BIECHLER getting the low-down, and so on.

All these pictures were taken indoors, using only the normal artificial light available. (For camera enthusiasts: lens opening—f 1.7; speed, 1/5 second.) Come in sometime and see the originals—much of the sharpness of detail is lost in the engraving process.

Incidentally, Mr. Kettering knew all about our little camera. He had one like it!

* * *

Mr. Sloan's Dinner

Here are some random notes jotted down during that newsmaking dinner:

Mr. Sloan flew from New York to Chicago for the dinner in a brand new TWA transport plane in *three hours,* establishing a new record. When he landed at the Chicago airport, he christened the plane *City of Chicago.*

One entire floor of the Stevens hotel was reserved for Mr. Sloan's party.

The formal program was broadcast over 66 stations of the NBC network, which cancelled all commercial programs scheduled for that time—justifying this expensive cancellation by reasoning that this was one of the biggest news events of the month.

It was claimed that the guests at the dinner represented more millions of dollars than had ever been gathered together before in one room.

There wasn't a fat man in the crowd. Most of the executives, however, were larger than the average-sized man—tall, broad-shouldered, and thick-chested.

Clothes—the writer was caught up a tree. The invitational telegram from Mr. Sloan did not specify attire, but we assumed that dinner clothes were indicated. So we exhumed our tux out of the mothballs, and took along a light suit to wear while doing the Fair next day. Imagine our embarrassment to learn that business suits were the order of the day. But there was nothing to fear, for the executives came in every shade and hue—including stripes, checks, and plaids—in the tailor's catalog. Most of them seemed carelessly dressed.

In general, the executives were either graying, white-haired, or in some stage of baldness. More than half wore glasses. Nearly all smoked cigars—only three or four cigarette smokers in the crowd.

Opening day snapshots taken at the 1934 A Century of Progress exposition in Chicago. Top row: (1) A smocked artist takes a final survey of his handiwork in the Frigidaire exhibit. (2) Frigidaire's Harry Smith (center) and Thomas Midgley (right) leave the Frigidaire air-conditioned home. (3) The home itself. (4) Jim Nance, manager of the air-conditioning department, and Jim Irwin, public relations man, on the veranda of the home. (5) The General Motors building at night. This year its white instead of salmon

Bottom row: (1) New Ford building at night. (2) The Swift outdoor auditorium, built on the lagoon, where the Chicago Symphony Orchestra will play. (3) G-E home economists make their first demonstration. (4) Some of the exhibits were still unfinished. (5) Indians, soldiers—everybody came to help set a new attendance record.

Walsh Will Manage Sale of Campbell Air Conditioners

NEW YORK CITY—Simplified air-conditioning equipment to be used in conjunction with radiator heating systems and which will be sold by the contractors who are now supplying those systems is now being prepared for sale by the affiliate companies of the American Radiator & Standard Sanitary Corp., according to Fowler Manning, director of the air-conditioning division of the corporation.

Mr. Manning made this statement in announcing the appointment of E. V. Walsh, formerly vice president in charge of sales and advertising for the Timken Silent Automatic Co., as sales manager of the air-conditioning division of the Campbell Metal Window Corp., one of the affiliates of the American Radiator & Standard Sanitary Corp.

Following experimentation with product development and experimentation with air-conditioning selling now under way in the New York area, the Campbell Corp. will inaugurate nation-wide marketing through the plumbing and heating trade, Mr. Manning said.

"Air-conditioning equipment should be designed so that the public will not be called upon to learn a lot of new tricks about how to operate its heating equipment in order to have air conditioning," Mr. Manning declared. "We should provide for the public air conditioning that corresponds to the heating in use, with which people are familiar.

"Consequently, equipment expressly designed for use in conjunction with radiator heat, and which piping men can supply, is being prepared, and in due course will be placed on sale through these men."

Mr. Manning added that special technical information presenting air conditioning in a simplified form for contractors, engineers, and architects is now being prepared by the air-conditioning division of the holding corporation.

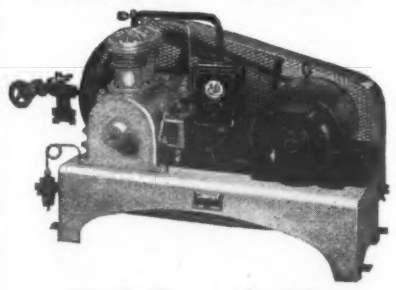
"We believe," he said, "that the whole question of air conditioning has been made too complicated by writers in the general and trade publications. Therefore, we are now preparing educational material to be ready when needed for sales organizations, for jobbers, contractors, and mechanics, and for architects and engineers."

Four Air-Conditioning Dealers Named by G-E

SCHENECTADY — Appointment of four new dealers to sell the complete line of G-E air-conditioning equipment was announced last week by the air-conditioning department of the General Electric Co.

The newly appointed dealers include: Allen-Harper Electrical Engineering Corp., 206 S. Limestone St., Lexington, Ky.; Hardware & Supply Co., 475 S. High St., Akron, Ohio; Stark Marble & Tile, Inc., 814 N. Cleveland Ave., Canton, Ohio; and Baker Music House, Ottumwa, Iowa.

FREON UNITS



FOR AIR CONDITIONING

- If you are a contractor or builder of air conditioning systems, investigate the added advantages of using Reliance Condensing Units as a part of your complete assemblies. With Reliance you will find features that insure uninterrupted, low-cost, trouble-free service.

GALVANIZED STEEL FINNED COILS

- Fins and tubes are ALL STEEL with positive METAL-TO-METAL CONTACTS. No oxidation will take place between tubes and fins. Continued high rate of BTU transfer is always assured.

1/3 TO 30 TONS DAILY CAPACITY

RELIANCE

REFRIGERATING MACH. CO., 3409 N. KEDZIE AVE., ... CHICAGO

Export Div: The A. J. Alsdorf Corp. 223-7 W. JACKSON BLVD., CHICAGO, ILL., U.S.A. Cable: ALSDORF-CHICAGO.

Promotion of Servel Air Conditioning in New York Outlined

NEW YORK CITY—Plans to push Servel commercial and air-conditioning products throughout the New York metropolitan area were outlined at a sales conference recently held for dealers and salesmen by the New York branch of Servel Sales, Inc.

W. J. Aulsebrook, visiting sales application engineer from the Servel factory, conducted a two-day session attended by 25 dealers and branch representatives. All models in the new air-conditioning line were presented, sales points and selling policy explained, and procedure for retail salesmen covered in detail.

Particular attention was given the new Servel self-contained air-conditioning unit. Convinced that New York offers a ready market for the simplicity and low cost of the self-contained type of air-conditioning equipment, special efforts will be devoted to its sale, according to P. J. Griffin, manager of the New York branch.

Application of other types, such as the floor-type and suspension units, commercial and industrial equipment included in the Servel line, were also discussed.

A third day Mr. Aulsebrook devoted to conference with heads of the branch sales department, completing plans to coordinate sales activities for all the company's products in the eastern district.

York System Cools Air In Kansas City Hotel

KANSAS CITY—To cool air in the attractive grill room and new Rendevous cocktail lounge of the Hotel Muehlebach here, a 55-ton York system is being installed by the local branch of York Ice Machinery Corp.

A brine system with CO_2 as the refrigerant was formerly used to cool the grill and first-floor coffee shop. That system will continue to supply conditioned air to the latter, and will also serve other of the hotel's refrigeration requirements.

The new York unit, using Freon, will cool water which passes into a Sturtevant spray system having a capacity of 6,600 c.f.m., according to F. V. Becklean of the York branch. Air will be passed through this spray for cooling, cleaning, and dehumidification.

Existing ducts will be used for air distribution in the grill, but new ducts are being constructed in the cocktail room. While the York equipment is being installed, some ice is used in the spray chamber of the old system to cool the grill; without some ice cooling, the CO_2 unit would not serve both the grill and coffee shop satisfactorily.

The new system is designed to effect a 50 per cent relative humidity in the lounge and grill, and hold the dry bulb temperature 15° F. below the outside temperature, according to Mr. Becklean. Seating capacity of the grill is 500, of the cocktail room, 150.

Rubenson to Study Air Cooling for Hawaii

EVANSVILLE, Ind.—The encouraging prospects of combating the Hawaiian heat with air conditioning brought J. W. Rubenson, veteran electrical appliance engineer, back to this country from his station in the islands, after an absence of three and one-half years.

For four years Mr. Rubenson has served as manager of the electrical refrigeration department of the Theo. H. Davies & Co., Ltd., in Honlulu, Hilo, which for the past seven years have been sole distributors for Servel in the Islands.

Landing in this country, Mr. Rubenson went direct to the Servel factories in Evansville, where he spent two weeks gaining first hand information about the Servel air-conditioning equipment with which his company expects to provide new comfort facilities for modern homes as well as business offices and industrial buildings in Honolulu and adjacent territory.

"There is a definite necessity for air conditioning in Hawaii," Mr. Rubenson said. "Availability of simplified, practical and low cost installations of this 'manufactured comfort' will prove a great boon to its inhabitants. We are determined to cultivate the extensive market which we feel that Hawaii's modern cities and prosperous industries and pleasure resorts offer."

Chicago Newspaper Offices Cooled by Westinghouse

CHICAGO—Two large newspaper offices are being air conditioned with Westinghouse equipment here this year. First is the Tribune Tower, whose 600 tons of steam jet refrigeration is installed and ready to be started; the other is the Chicago Daily News building on Madison St.

Constant Traveler Finds Upper Berths Best in Air Cooled Cars

Editor's Note: Dr. Bion R. East of Detroit, widely known for his interest in matters of public health, particularly in the introduction of Vitamin D in milk, is a constant traveler.

He wrote the following interesting comment relative to the air conditioning of Pullman railway cars while on a recent trip.

New York Central Lines
Enroute
May 30, 1934.

Editor:

The impressions of a traveler on air-conditioned Pullmans may be of interest to you.

I am enroute from New York City to South Bend; this train is air conditioned in a most effective manner as far as day temperature is concerned, but at night when the berths are made up and the curtains of lower berths closed the air in the lower berth is not so good. Keep in mind that the usual ventilation from the windows is shut off.

I found it rather uncomfortable—with ready relief when I opened the curtain—which I did during the night.

The porter informed me that this was not true in an upper berth, which one can easily understand.

With the present system the knowing traveler will use a section, or if that is too costly, will sleep in uppers.

Hereafter when making reservations I will enquire about air conditioning. If it is being used I shall save money for more comfort by using an upper berth.

B. R. East.

Warm Air Heaters Study Conditioning

CHICAGO — Residential air conditioning, insulation of homes, and air-conditioning research will come up for discussion here next week when the members of the National Warm Air Heating and Air Conditioning Association convene for their annual convention. Sessions are to be held in the Stevens Hotel, Wednesday and Thursday, June 13 and 14.

This association, together with the American Society of Heating and Ventilating Engineers, sponsored many of the research projects into home heating and cooling which the Engineering Experiment Station at the University of Illinois has been conducting during the past several years. Several of these pertaining to refrigeration have been reported in Electric Refrigeration News.

First meeting of the convention will be called Wednesday morning by H. T. Richardson, president of the association, with his annual report.

The morning session will then hear I. W. Rowell and J. F. Firestone on "Cooperation with Heating Contractors Essential," H. W. Thorne on "Is Our Business Different," and "Our Installation Codes" by Prof. J. D. Hoffman. Bernard L. Johnson will discuss the question "What's Ahead in Residential Building," telling about government plans for financing new homes, and picturing modernization and trends in design and equipment.

The afternoon meeting is planned for manufacturers and dealers, and is devoted chiefly to code discussions. F. E. Mehrings will talk on "Trade Relations," followed by NRA code discussions by the following:

Roofing and sheet metal contracting industry by W. C. Markle; the furnace manufacturing industry by A. W. Wrieden; the register manufacturing industry by R. W. Blanchard; the furnace pipe and fittings industry by George Harms. Final address of the day will be by W. J. Hennessy on "Our Modern Equipment and its Engineering."

Thursday morning is devoted to research problems, and is opened with a talk on "Fifteen Years of Research in the Furnace Heating Industry" by Prof. A. C. Willard, president-elect of the University of Illinois. Next is the research advisory committee report by F. G. Sedgwick, chairman.

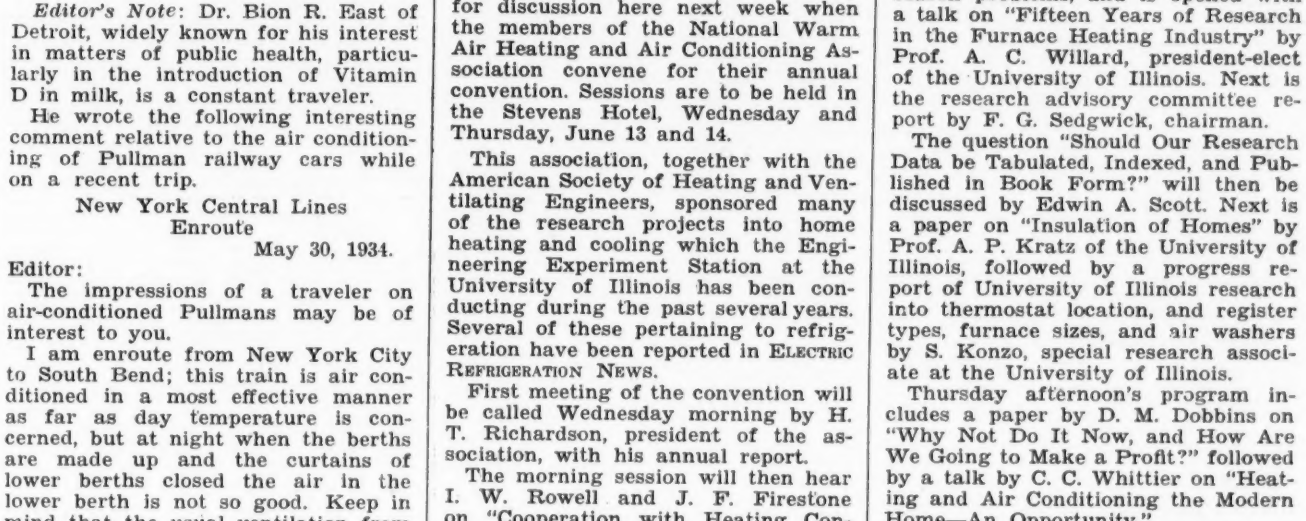
The question "Should Our Research Data be Tabulated, Indexed, and Published in Book Form?" will then be discussed by Edwin A. Scott. Next is a paper on "Insulation of Homes" by Prof. A. P. Kratz of the University of Illinois, followed by a progress report of University of Illinois research into thermostat location, and register types, furnace sizes, and air washers by S. Konzo, special research associate at the University of Illinois.

Thursday afternoon's program includes a paper by D. M. Dobbins on "Why Not Do It Now, and How Are We Going to Make a Profit?" followed by a talk by C. C. Whittier on "Heating and Air Conditioning the Modern Home—An Opportunity."

Remainder of the convention is devoted to routine business and will adjourn Thursday evening.

5 Floors of Field Bldg. To Be Air Cooled

CHICAGO—Offices in the first five floors of the new Field building, now being finished on LaSalle St. here, will be air conditioned when the building officially opens some time this month. The installation includes three Carrier centrifugal compressors producing 350 tons of refrigeration.



Read it and Reap
BIGGER PROFITS

Hundreds of refrigeration dealers are already reaping profits traceable to the day they sent for this BRUNNER CATALOGUE. Idle curiosity turned to active interest before they finished the preface page. For *here* without "ifs" — "ands" or "buts" *is* a line of refrigeration equipment that equals *any* in quality and beats them *all* in value.

Six dependable compressors, seventeen efficient highsides — air and water cooled units—gas engine or electric—in a range from 1/6 H.P. to 3 H.P. Send *your* coupon today. Study the specifications of these rugged BRUNNER units. Compare their construction. Visualize their sales possibilities. We believe you will agree with us when we say — This is a BRUNNER year!

BRUNNER MANUFACTURING COMPANY
UTICA, N. Y., U. S. A.

BRUNNER
A Name Built by 28 Years of Service

Brunner Manufacturing Company
Utica, N. Y.

Send me the Brunner Catalogue.

Name .....

Address .....

City .....

STATISTICS

15 Manufacturers Sell 232,124 Household Refrigerators in April, 1934

The following member companies reported sales: Crosley, Frigidaire, General Electric, Gibson, Kelvinator, Norge, Servel, Sparks-Withington, Stewart-Warner, Sunbeam, Trupar, Uniflow, Universal Cooler, Westinghouse, and Wurlitzer. Member companies whose sales are not included are: Apex, Jomoco, Leonard, Merchant & Evans, and Potter.

HOUSEHOLD Lacquer (Exterior) Cabinets with Systems	Domestic Sales Quantity	Domestic Sales Value	Canadian Sales Quantity	Canadian Sales Value	Other Foreign Sales Quantity	Other Foreign Sales Value
1. Under 4.00 cubic feet..	1,924	$ 106,813	.....	$	164	$ 10,020
2. 4 to 4.99 cubic feet..	60,048	3,895,544	690	44,850	2,701	201,149
3. 5 to 5.99 cubic feet..	49,689	3,800,949	388	24,943	269	21,419
4. 6 to 6.99 cubic feet..	31,388	2,840,308	468	43,126	1,130	114,490
5. 7 to 7.99 cubic feet..	24,520	2,693,727	58	6,184	156	16,885
6. 8 to 9.99 cubic feet..	5,361	655,784	52	6,318	213	26,027
7. 10 to 12.99 cubic feet..	123	11,915	1	237	9	1,905
8. 13 to 24.00 cubic feet..	46	8,480	.....	.....	....	.....
9. Total Lacquer	**173,099**	**14,013,520**	**1,657**	**125,658**	**4,642**	**391,395**
Porcelain (Exterior) Cabinets with Systems						
10. Under 4.99 cubic feet..	3,025	238,153	4	353	281	24,643
11. 5 to 5.99 cubic feet..	5,011	466,490	38	2,510	145	13,777
12. 6 to 6.99 cubic feet..	14,314	1,597,377	31	3,600	470	53,101
13. 7 to 7.99 cubic feet..	12,920	1,668,701	24	3,618	468	58,794
14. 8 to 9.99 cubic feet..	4,079	585,485	6	941	96	13,755
15. 10 to 12.99 cubic feet..	982	171,231	3	509	80	13,857
16. 13 to 24.00 cubic feet..	280	63,591	1	212	64	14,364
17. Total Porcelain	**40,611**	**4,791,028**	**107**	**11,743**	**1,604**	**192,291**
18. Total Lines 9 and 17....	**213,710**	**18,804,548**	**1,764**	**137,401**	**6,246**	**584,186**
19. Separate Systems	9,462	412,314	.....	.....	193	16,203
20. Separate Household Low Sides	489	8,354	55	832	205	2,793
21. Total Lines 18, 19, 20...	**223,661**	.....	**1,819**	.....	**6,644**	.....
22. High Sides, ¼ hp. or Less	353	19,328	37	1,854	258	14,196
23. Cabinets—No Systems..	48	4,786	1	105	1	105
24. Total Household	.....	**19,249,330**	.....	**140,192**	.....	**617,483**
COMMERCIAL						
25. Water Coolers with High Sides	1,474	127,441	6	306	25	2,597
26. Water Coolers with No High Sides.....	77	4,215	3	171	3	184
27. Ice Cream Cabinets with High Sides.....	581	84,261	72	5,409	189	25,252
28. Ice Cream Cabinets with No High Sides....	494	65,059	11	1,371	26	3,385
29. Beverage Coolers with High Sides	†1,795	†137,068	1	144	13	987
30. Beverage Coolers with No High Sides.....	158	11,683	....	.....	4	172
31. Room Coolers with High Sides	22	6,422	.....	.....	3	306
32. Room Coolers with No High Sides.....	109	14,899	2	298	16	1,744
Extra High Sides						
33. ⅛ to ½ hp. Incl.....	†2,862	†200,112	40	3,337	1,351	82,826
34. Above ½ to 1 hp. Incl...	1,429	143,676	101	11,598	380	47,994
35. Above 1 to 5 hp. Incl...	821	95,405	8	1,339	102	20,647
36. Above 5 to 10 hp. Incl...	110	33,813	.....	.....	13	2,224
37. Above 10 hp.	.....	.....	.....	.....	.....	.....
38. Total Lines 33, 34, 35, 36, and 37	**†5,222**	.....	**149**	.....	**1,846**	.....
39. Total Lines 25, 27, 29, 31, and 38	**9,094**	.....	**228**	.....	**2,076**	.....
40. Extra Commercial Low Sides	4,477	164,333	313	8,280	1,197	35,848
41. Miscellaneous Cases and Cabinets	48	16,623	4	550	5	1,444
42. Total Commercial	.....	***1,105,010**	.....	**32,303**	.....	***225,610**
43. Totals—Household and Commercial	.....	***$20,354,340**	.....	**$172,995**	.....	***$843,093**

†Corrected figures.
*Note: Two companies did not report in breakdown form. Therefore we have added their totals to the report as follows:

	Domestic Sales Value	Foreign Sales Value	Distributor Quantity	Distributor Value	Production Quantity
Line 9	.....	.....	43,934	$3,602,392	64,128
Line 17	.....	.....	20,466	2,528,109	10,986
Line 18	.....	.....	64,400	6,130,501	75,114
Line 21	.....	.....	64,749	.....	153,375
Line 24	.....	.....	.....	6,148,589	.....
Line 38	.....	.....	2,563	.....	3,284
Line 39	.....	.....	5,023	.....	3,879
Line 42	$1,240,223	235,848	.....	840,600	.....
Line 43	20,489,553	853,331	.....	6,989,189	.....

McCORD
REFRIGERATION
PRODUCTS
◇
COMMERCIAL EVAPORATORS
◆
DOMESTIC EVAPORATORS
◆
CONDENSERS
◆
METLFLEX ICE TRAYS
◆
SPIRAL FINNED TUBING
◆
SPIRAL COPPER FINNED IRON
STEEL OR COPPER PIPE
◇
McCORD
RADIATOR &
MFG. CO.
DETROIT. -:- MICH.

New York Leads States In April Sales

States and Territories	Quantity of Household Low Sides
Alabama	3,080
Arizona	609
Arkansas	1,342
California	9,818
Colorado	1,474
Connecticut	3,037
Delaware	532
District of Columbia	2,146
Florida	1,780
Georgia	5,016
Idaho	892
Illinois	15,764
Indiana	5,746
Iowa	3,489
Kansas	2,967
Kentucky	4,215
Louisiana	1,535
Maine	1,243
Maryland	4,713
Massachusetts	8,561
Michigan	9,121
Minnesota	2,893
Mississippi	939
Missouri	9,207
Montana	770
Nebraska	3,636
Nevada	238
New Hampshire	755
New Jersey	8,604
New Mexico	482
New York	23,793
North Carolina	5,461
North Dakota	757
Ohio	17,024
Oklahoma	3,210
Oregon	3,101
Pennsylvania	19,094
Rhode Island	1,278
South Carolina	2,438
South Dakota	556
Tennessee	5,110
Texas	10,402
Utah	1,195
Vermont	472
Virginia	4,811
Washington	3,660
West Virginia	3,573
Wisconsin	2,832
Wyoming	290
Total United States	**223,661**
Total Canada	1,819
Other Foreign (Including U. S. Possessions)	6,644
Total for World	**232,124**

147,830 Household Refrigerators Manufactured in April, 1934; Distributors and Dealer Stocks Total 109,292 Units

U. S. A. INVENTORIES HOUSEHOLD Lacquer (Exterior) Cabinets with Systems	Factory, Branch & Warehouse Quantity	Factory, Branch & Warehouse Value	Distributors Quantity	Distributors Value	Dealers Quantity	Dealers Value	Production Quantity
1. Under 4.00 cubic feet.....	335	$ 19,680	561	$ 31,325	1	$ 70	2,286
2. 4 to 4.99 cubic feet.....	38,312	2,602,800	13,008	828,030	12,256	809,211	16,874
3. 5 to 5.99 cubic feet.....	20,327	1,669,821	9,217	702,807	7,003	517,655	22,048
4. 6 to 6.99 cubic feet.....	13,369	1,215,399	8,983	833,226	10,915	994,710	1,460
5. 7 to 7.99 cubic feet.....	24,192	2,827,185	5,334	585,191	4,448	510,816	14,954
6. 8 to 9.99 cubic feet.....	3,136	383,323	962	122,677	2,080	256,571	1,465
7. 10 to 12.99 cubic feet.....	234	44,812	159	30,009	100	18,656	2
8. 13 to 24.00 cubic feet.....	120	23,867	69	15,252	16	3,847	11
9. Total Lacquer	**100,025**	**8,786,887**	***38,293**	***3,148,517**	**36,819**	**3,111,536**	***59,100**
Porcelain (Exterior) Cabinets with Systems							
10. Under 4.99 cubic feet.....	11,192	993,501	993	87,874	1,777	147,550	612
11. 5 to 5.99 cubic feet.....	2,361	233,012	1,745	171,087	941	90,952	2,537
12. 6 to 6.99 cubic feet.....	8,050	908,783	4,999	598,868	5,713	662,512	4,403
13. 7 to 7.99 cubic feet.....	15,739	1,979,771	5,044	672,969	6,215	802,490	2,184
14. 8 to 9.99 cubic feet.....	5,057	714,012	2,190	316,802	2,554	362,223	525
15. 10 to 12.99 cubic feet.....	1,115	192,200	479	88,291	570	101,752	129
16. 13 to 24.00 cubic feet.....	1,392	330,792	276	66,453	147	32,257	79
17. Total Porcelain	**44,906**	**5,352,071**	***15,726**	***2,002,344**	**17,917**	**2,199,736**	***10,469**
18. Total Lines 9 and 17	**144,931**	**14,138,958**	***54,019**	***5,150,861**	**54,736**	**5,311,272**	***69,569**
19. Separate Systems	1,424	63,215	.....	.....	.....	.....	26,743
20. Separate Household Low Sides	17,215	254,830	349	6,658	188	3,132	51,518
21. Total Lines 18, 19, and 20	**163,570**	.....	***54,368**	.....	**54,924**	.....	***147,830**
22. High Sides, ¼ hp. and Less.....	7,600	378,440	143	7,430	155	8,157	45,096
23. Cabinets—No Systems	45,901	2,400,954	54	4,000	25	2,098	46,532
24. Total Household		**17,236,397**	.....	***5,168,949**	.....	**5,324,659**	.....
COMMERCIAL							
25. Water Coolers with High Sides.....	7,114	711,754	2,089	225,819	537	49,731	295
26. Water Coolers with No High Sides.....	1,972	71,139	73	3,768	42	2,270	56
27. Ice Cream Cabinets with High Sides.....	2,649	374,658	115	16,645	9	1,317	5
28. Ice Cream Cabinets with No High Sides....	3,858	520,791	247	31,410	16	1,881	9
29. Beverage Coolers with High Sides.....	1,291	99,316	198	14,621	235	16,560	240
30. Beverage Coolers with No High Sides.....	431	24,422	118	6,736	67	4,839	.....
31. Room Coolers with High Sides.....	279	96,700	5	1,556	.....	.....	55
32. Room Coolers with No High Sides.....	1,464	166,238	258	26,553	69	7,978	26
33. Extra High Sides, ⅛ to ½ hp. incl.....	6,423	569,255	1,297	120,752	555	43,302	1,572
34. Extra High Sides, Above ½ to 1 hp. Incl....	1,873	263,709	610	82,521	215	27,549	526
35. Extra High Sides, Above 1 to 5 hp. Incl....	1,908	405,961	464	101,410	115	21,209	131
36. Extra High Sides, Above 5 to 10 hp. Incl....	90	51,136	1	592	.....	.....	68
37. Extra High Sides, Above 10 hp.....	.....	.....	.....	.....	.....	.....	.....
38. Total Lines 33, 34, 35, 36, and 37.....	**10,294**	.....	***2,372**	.....	**885**	.....	***2,297**
39. Total Lines 25, 27, 29, 31, and 38.....	**21,627**	.....	***4,779**	.....	**1,666**	.....	***2,892**
40. Extra Commercial Low Sides	24,552	705,417	3,574	118,687	1,243	32,729	21,943
41. Miscellaneous Cases and Cabinets.....	905	250,348	189	62,607	34	9,061	582
42. Total Commercial	.....	**4,310,844**	.....	***813,677**	.....	**218,426**	.....
43. Totals—Household and Commercial.....	.....	**$21,547,241**	.....	***$5,982,626**	.....	**$5,543,085**	.....

*See explanation in columns one and two.

Bureau Estimates Sales at 147% of 4-Months Quota

The following estimate of sales for the first four months of 1934 was made by the Electric Refrigeration Bureau on the basis of reports submitted by state bureaus.

	Four Months Quota*	Estimated Total Sales	% Quota Realization
New England Division			
Connecticut	6,927	7,085	102.2
Maine	2,844	2,853	100.3
Massachusetts	17,721	22,150	124.9
New Hampshire	1,834	1,666	90.8
Rhode Island	2,907	3,264	112.2
Vermont	1,190	982	82.5
Eastern Division			
Delaware	739	1,328	179.7
Maryland & D. C.	7,315	15,762	215.4
New Jersey	17,713	21,636	122.1
New York	55,724	64,954	116.5
Pennsylvania	31,204	47,373	153.4
East Central Division			
Kentucky	4,065	8,673	213.3
Ohio	23,296	38,255	164.2
West Virginia	2,869	7,425	258.8
Middle West Division			
Iowa	6,844	9,068	132.4
Kansas	5,086	9,111	179.1
Missouri	10,017	21,789	217.5
Nebraska	3,522	7,223	205.0
Pacific Coast Division			
Arizona	1,050	1,659	158.0
California	28,330	28,445	100.4
Nevada	257	519	201.9
North West Division			
Idaho	1,189	2,133	179.3
Montana	1,278	1,802	141.0
Oregon	3,604	7,681	213.1
Utah	1,751	2,896	165.3
Washington	6,489	8,396	129.3
South Eastern Division			
Alabama	2,587	6,611	255.5
Florida	3,524	4,446	126.1
Georgia	2,991	9,189	307.2
North Carolina	3,940	10,630	269.7
South Carolina	1,569	4,547	289.8
Tennessee	3,522	9,932	281.9
Virginia	3,971	9,503	239.3
Great Lakes Division			
Illinois	27,774	35,470	127.7
Indiana	10,178	14,151	139.0
Michigan	15,979	20,746	129.8
Wisconsin	9,425	9,501	100.8
North Central Division			
Minnesota	7,126	7,191	100.9
North Dakota	904	1,520	168.1
South Dakota	1,158	1,683	145.3
Rocky Mountain Division			
Colorado	3,031	4,064	134.0
New Mexico	500	1,074	214.8
Wyoming	472	836	177.1
Southwestern Division			
Arkansas	1,639	3,290	200.7
Louisiana	2,967	3,615	121.8
Mississippi	1,284	1,936	150.7
Oklahoma	3,791	8,011	211.3
Texas	9,685	23,009	237.5
Totals	**363,782**	**535,583**	**147.2**

*Four-months quota is 36 per cent of years quota of 1,010,506 refrigerators.

Sparton Exports 10% of Refrigerator Output

JACKSON, Mich.—Ten per cent of the Sparks-Withington Co.'s production of Sparton refrigerators are being shipped abroad to more than 60 foreign markets, according to a statement made last week by Harry Sparks, vice president of the Sparks-Withington Co., in commenting upon the export trade revival.

Mr. Sparks declared that South Africa is one of the world's best buyers of electric refrigerators.

Exports of Electric Refrigerators

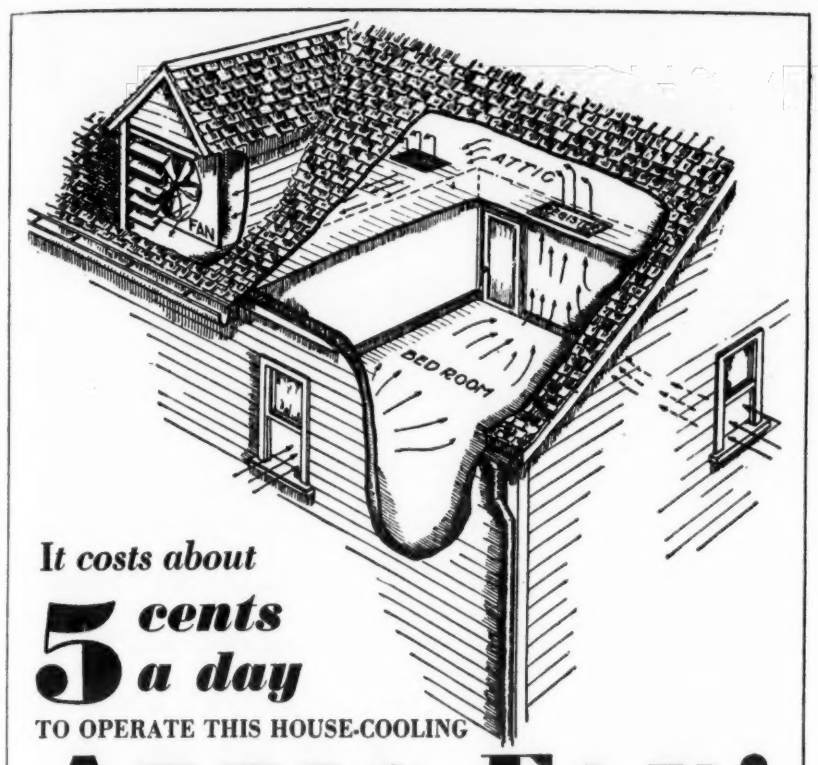
March, 1934, Shipments Reported by the Bureau of Foreign and Domestic Commerce, Washington, D. C.

	Electric Household Refrigerators Number	Electric Household Refrigerators Value	Electric Commercial Refrigerators Up to 1 Ton Number	Electric Commercial Refrigerators Up to 1 Ton Value	Parts for Electric Refrigerators Value
Austria	7	$ 486	...	$ ...	$ 39
Belgium	287	23,885	141	11,373	12,159
Czechoslovakia	17	822	...	...	2,679
Denmark	6	465	80	6,878	3,719
Finland	22	1,646	5	870	1,783
France	710	57,202	96	15,658	39,170
Germany	28	2,117	7	1,176	9,409
Greece	2	170	...	...	6
Hungary	18	1,818	5	418	26
Iceland	7	467	...	...	35
Irish Free State	2	304	61	8,224	323
Italy	327	27,527	169	15,830	15,415
Malta, Gozo, and Cyprus	3	437	...	...	30
Netherlands	19	1,968	101	8,362	9,329
Norway	142	12,411	24	2,542	1,950
Poland and Danzig	1	137	1	139	108
Portugal	9	727	...	...	543
Rumania	10	753	...	...	210
Soviet Russia in Europe	2	264	...	...	...
Spain	396	29,366	88	7,196	10,825
Sweden	59	4,833	165	13,905	4,007
Switzerland	64	5,751	193	19,666	19,862
United Kingdom	2,303	168,882	1,652	96,775	49,501
Yugoslavia	...	...	...	...	64
Canada	172	16,600	456	20,867	82,822
Costa Rica	1	54	2	342	128
Guatemala	3	178	...	...	19
Honduras	2	235	...	...	...
Nicaragua	2	286	...	...	...
Panama	20	2,307	9	5,462	1,003
Salvador	10	938	...	...	2
Mexico	218	17,427	16	2,286	1,362
Newfoundland and Labrador	...	...	...	...	84
Bermudas	1	102	...	...	89
Barbados	2	289	...	...	199
Jamaica	...	...	...	...	28
Trinidad and Tobago	32	2,832	...	...	22
Other British West Indies	5	399	...	...	26
Cuba	186	14,791	12	822	2,056
Dominican Republic	3	179	...	...	109
Netherland West Indies	18	1,858	...	...	106
French West Indies	4	321	...	...	...
Haiti, Republic of	14	1,616	...	...	2
Virgin Islands of U. S.	5	580	...	...	16
Argentina	8	701	...	...	19,710
Brazil	397	34,463	31	3,724	8,007
Chile	...	...	...	...	13
Colombia	30	2,372	...	...	314
Ecuador	1	71	...	...	...
Surinam	19	2,760	...	...	...
Peru	16	1,723	...	...	271
Uruguay	...	...	...	...	221
Venezuela	44	4,058	...	...	1,726
Aden	...	...	...	...	7
British India	69	6,861	1	135	1,633
British Malaya	80	7,618	3	518	735
Ceylon	20	1,785	...	...	80
China	215	13,941	31	3,866	4,337
Netherland East Indies	69	6,442	1	320	1,116
Hong Kong	61	6,162	...	...	329
Japan	68	6,234	8	1,120	2,841
Palestine	96	7,847	42	7,239	1,069
Philippine Islands	142	14,789	12	1,471	1,182
Syria	2	170	...	...	13
Turkey	...	...	24	2,637	6
Other Asia	1	195	...	...	257
Australia	279	13,471	1	106	2,908
French Oceania	1	109	...	...	...
New Zealand	16	1,267	...	...	144
Belgian Congo	...	...	1	388	367
British East Africa	6	585	1	135	465
Union of South Africa	297	30,514	10	1,700	5,573
Other British South Africa	1	232	3	151	116
Gold Coast	...	...	...	...	182
Nigeria	1	117	...	...	935
Egypt	10	766	1	530	479
Algeria and Tunisia	409	35,146	68	8,396	4,679
Other French Africa	13	1,792	...	...	475
Italian Africa	3	191	...	...	...
Morocco	217	18,678	27	4,253	2,387
Mozambique	30	2,283	...	...	50
Canary Islands	3	306	...	...	...
Other Spanish Africa	4	265	...	...	...
Total	**7,767**	**$627,143**	**3,548**	**$275,480**	**$331,892**
Shipments to Hawaii	172	17,052	10	2,117	10,091
Puerto Rico	23	1,991	2	380	1,200

DETROIT LUBRICATOR COMPANY
TRUMBULL, LINCOLN, MARQUETTE & VIADUCT
DETROIT, MICH.

Manufacturers of "Genuine Detroit" Automatic and Thermostatic Expansion Valves, American Cubemakers, American Refrigeration Sections, Automatic Controls for Temperature and Pressure, Electric Valves for Refrigerant and Water Control, Thermostats, Humidistats and complete controls for Air Conditioning.
Descriptive literature gladly sent upon request
Division of
AMERICAN RADIATOR & STANDARD SANITARY CORPORATION

How the Detroit Edison Co. Is Promoting Air Conditioning



It costs about

5 cents a day

TO OPERATE THIS HOUSE-COOLING

ATTIC FAN!

Cooling for comfort means cooling for improved efficiency and health. The type of cooling shown here—that using an attic fan for expelling warm air and drawing in cooler outdoor air—is relatively inexpensive.

The fan is placed in the attic. Cool night air is pulled in through the windows and the warm air is drawn from the house and exhausted out-of-doors through attic windows or other openings. Air reaches the attic through registers cut in the bedroom ceilings, or up the attic stairway. Such an installation costs from about $150 upwards. The operating cost in some actual cases has been less than five dollars for the entire summer. Records from these installations show that on some evenings the temperature in upstairs bedrooms is lowered as much as 8 degrees in an hour. Users say, "It's like sleeping outdoors."

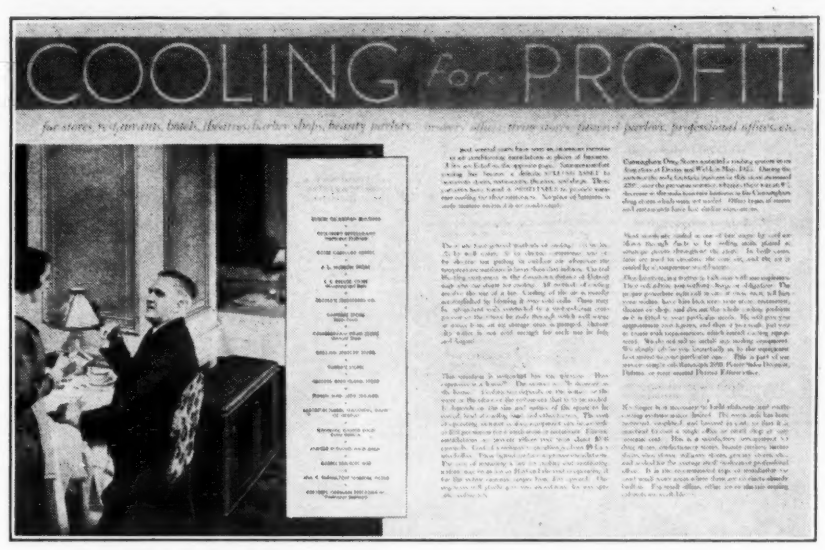
In a similar way cooling can be obtained by operating the fan of a forced-circulation warm air heating system on summer evenings. Some degree of cooling may also be obtained in this way for many commercial premises. Fan cooling is an ideal compromise between a more expensive electric compressor installation and no cooling at all.

If you desire still more effective summer cooling, there are three other general methods you can choose: (1) ice, (2) well water, (3) electric compressor. All methods of cooling involve the use of a fan. Cooling of the air is usually accomplished by blowing it over cold coils. These may be refrigerant coils connected to a motor-driven compressor or they may be coils through which well water or water from an ice storage tank is pumped. The cost of operating summer cooling equipment can be as little as $50 per season for a small store or restaurant. Electric installations for private offices cost from about $350 upwards. Cost of a summer's operation may be as low as $8 for a small office. These figures are for compressor installations.

If you have a cooling problem, we invite you to talk over the matter with our engineers. They will advise you without charge or obligation. The proper procedure is to call in one of these men, tell him your wishes, have him look over your store, theater, restaurant, office or house, and discuss the whole cooling problem as it is fitted to your particular needs. He will give you approximate cost figures, and then if you wish, put you in touch with organizations which install cooling equipment. We do not sell or install any cooling equipment. We simply advise you impartially as to the equipment best suited to your particular case. This is part of our service, and is obtainable by calling Randolph 2100, Power Sales Division.

THE **DETROIT EDISON** CO.

This is a sample of newspaper copy used. While the attic fan is featured, other types of air conditioning are mentioned and described briefly. Estimates are given on the cost of installing air-conditioning equipment and operating it for the season. Readers are invited to step in and talk to the utility's engineers about the matter of installing comfort cooling for homes, offices, and commercial establishments.



Reproduced above are four pages from the 8-page air-conditioning promotional booklet which Detroit Edison Co. is mailing to 17,000 prospects. The utility does not sell any equipment, but is actively engaged in the promotion of air conditioning. The top illustrations show a two-page spread aimed at commercial prospects. Superimposed on the picture which shows a restaurant application is a panel containing a list of prominent commercial installations of comfort cooling. The other two-page spread reproduced here is titled "Cooling for Comfort" and is directed at prospective household users of air conditioning. Various methods of room cooling and the cost factor are discussed in the copy.

Air Conditioning Is Displayed at Fresno Electrical Exposition

FRESNO, Calif.—Both household electric refrigeration and air-conditioning equipment were exhibited at the second annual Fresno Electric Equipment Exposition, held May 17-19 in the Fresno Civic Auditorium and which was attended by 17,700 visitors, or more than double the number that attended last year's show.

The Exposition was sponsored by the Retail Gas and Electric Appliance Society of Central California, headed by C. F. Cowan. This group offered a special inducement to public's attendance at the show by giving away two refrigerators during each day of the exposition.

A total of 23 dealers participated in the show, the following makes of household refrigerators being represented: Crosley, Cyclops, Electrolux, Frigidaire, General Electric, Grunow, Hotpoint, Leonard, Norge, Stewart-Warner, Westinghouse.

The air-conditioning displays included those of Frigidaire, General Electric, Westinghouse, Carrier, York, and Pernot-Rich.

As an added attraction for visitors, a special four-piece orchestra was obtained to play an hour during the afternoon and two hours during the evening. The orchestra broadcast a 15-minute program from the Exposition floor both afternoon and evening for each of the three days.

Dealers gave tickets on the drawing to their customers at their stores for several days in advance of the Exposition and at their several booths on the Exposition floor. In addition, special window cards, newspaper advertising, hand bills, and radio announcements were employed to publicize the Exposition.

New Conduit Features Ball Bearing Surface

CLEVELAND—A new type of conduit which provides a ball bearing surface that is said to reduce wire pulling friction has been developed by the Electrical Division of Steel & Tubes, Inc.

The inside of this new conduit, which is called "Electrunite Steeltubes," is processed, prior to forming and welding, so that the entire surface is covered with small, round, raised knobs which produce the ball bearing surface.

Associated System Planning Promotion On Air Conditioning

NEW YORK CITY—Operating utility companies of the Associated Gas & Electric System have opened a "Comfort Cooling" sales and promotional campaign which will continue through July 31.

Associated operating groups are following one of two courses in the promotion of air conditioning, namely:

1. Selling the idea of air conditioning, but leaving the actual merchandising of apparatus to equipment dealers.

2. Promoting the sale of air-conditioning equipment and actually merchandising it.

Where air-conditioning equipment is being merchandised, no equipment is carried in stock, but in several instances equipment has been installed in the company's office to give demonstrations of the apparatus under actual working conditions.

Demonstration equipment has also been installed on some properties not directly merchandising air conditioning.

New business managers of the various operating groups have been sent a Frigidaire sales manual on the selling of air conditioning to the home and office market. They have also been given a booklet descriptive of demonstrating rooms for presenting air-conditioning equipment.

Promotional advertising is being prepared by Dr. Daniel Starch and his staff.

In presenting its comfort cooling promotional plans to operating groups, the Associated Gas & Electric System drew up the following table to show what revenue an air-conditioning installation would represent to a utility company, based on several kilowatt hour rates, taking into account the number of months during the year that the average installation is operating.

The following estimated revenue table is based on the assumption that apparatus operates 12 hours per day for four months per year.

Connected Load Represented By Typical Air Conditioning Installations	Average Annual Estimated Revenue Per Air-Conditioning Installation Based On Various Kwh. Rates		
Kw.	1½c Kwh.	3c Kwh.	5c Kwh.
1.45	$ 31.32	$ 62.64	$ 104.40
1.85	29.96	79.92	133.20
2.87	61.99	123.91	206.64
4.00	86.40	172.80	288.00
6.00	129.60	259.20	432.00
8.00	172.80	345.60	576.00
14.00*	302.40	604.80	1,612.80

*Load represented by average installation made in 1933.

Comfort Cooling Is Exhibited at Newark

NEWARK, June 4—The New Jersey air-conditioning show opened here today in the former American Insurance Co. building under the sponsorship of the Public Service Electric & Gas Co. H. P. Morehouse, general air-conditioning representative of the utility, is directing the show.

Purpose of the show is to acquaint the public with facts concerning year 'round air conditioning, and to let the public know where they can get the equipment.

Tomorrow will be known as "Architects and Builders Day."

The room housing the education feature of the show is being cooled during the period of the show.

A smaller room is also equipped with air conditioning, to show how the equipment works in an executive office, or a library in a residence.

Even the DEPRESSION Couldn't RETARD this BUSINESS!

1934 will be one of the biggest years in the history of Taylor Freezer Corporation.

The growing realization that larger profits MUST result from "making your own ice cream", combined with Taylor's indisputable reputation for highest QUALITY in counter freezers, accounts for this astoundingly big demand for Taylor Freezers.

Mark this: The counter freezer industry, which Taylor pioneered, is growing by leaps and bounds. It is long past the experimental stage. Taylor Freezers are making real money for hundreds of druggists, hospitals, cafeterias, hotels and other establishments serving ice cream.

The dealer who has viewed this growing industry with a passive attitude is passing up one of the greatest profit-making possibilities of this age.

We want a few live, responsible, alert dealers right now to sell Taylor Freezers. Write us, or better, wire us now!

TAYLOR FREEZER CORP.

BELOIT, WISCONSIN

SERVICE

Service Problems and Solutions For Allison Refrigerators

ACTUAL service operations necessary in maintenance of the Allison electric refrigerator are given herewith as an aid to service men working on "orphan" ethyl chloride refrigerating systems. As explained in last week's issue of the NEWS—which carried a detailed description of the Allison system—this make was manufactured by the Domestic Electric Refrigerator Corp. of New York City, and has been out of production for several years. Charging a low-pressure refrigerant into a system differs somewhat from charging the common refrigerants of today, so instructions for charging the Allison follow:

(a) Be sure that all connections are made up tight and that purging valves are closed. (Purging valve stem turned all the way to right.)

(b) Remove blind nut on charging valve and connect one end of charging tubing to this fitting. Connect other end of tubing to the service charging drum.

(c) Remove sealing cap from end of charging valve and turn valve stem all the way in (to right) until it seats. Replace sealing cap to prevent liquid leaking out of end of valve.

(d) Suspend service charging drum in a vertical position with outlet facing downward at an altitude higher than expansion valve.

(e) Open valve on drum about three full turns and allow the liquid ethyl chloride to flow through charging valve and up into expansion valve.

(f) Open purge valve on top of expansion valve to allow the air and a small amount of gas to escape. (This air if not purged out of expansion valve will not permit sufficient ethyl chloride to enter the valve and actuate the float ball.)

(g) To determine if the liquid ethyl chloride is entering evaporator (chilling unit) place your ear near evaporator; if liquid is entering evaporator you will hear violent boiling. Shut off purge valve as soon as liquid starts entering the evaporator. (Do not at any time leave the purge valve open when liquid is escaping. Purge off *only gas or air.*)

(h) Allow liquid to enter evaporator for about ten minutes, then shut off valve on service charging drum by turning valve stem to right until it seats firmly.

(i) Remove sealing cap on charging valve and turn valve stem all the way *out* (to left) until it seats firmly.

(j) Remove charging tubing from charging valve (beneath condenser).

(k) Attach pressure gauge assembly to the same connection you used for charging tubing on charging valve.

(l) Crack open ½ turn to right on charging valve stem and observe gauge readings for 45 minutes.

(m) Replace sealing cap on charging valve; have this cap tight during the 45-minute gauge observation period.

NOTE: See gauge readings (below).

(n) Start machine by inserting service cord in electric circuit and pushing down on lever of sentinel breaker.

(o) Do not permit pressure to exceed 25 lbs. (Purge gas or air from expansion valve if pressure exceeds 25 lbs.)

(p) At expiration of 45-minute operation, if pressure is correct, remove sealing cap on end of charging valve stem all the way out (to left) until it seats firmly. Replace sealing cap using *new* lead gasket. Remove gauge assembly and replace blind nut on fitting of charging valve.

Gauge Readings

Gauge readings shold always be taken after the system has been opened up on such operations as adding ethyl chloride, charging the system, changing the expansion valve, evaporator, check valve, charging valve, operating unit, or adding oil to the system.

Operation for Taking Gauge Readings

(a) Remove blind nut on front of charging valve.

(b) Attach gauge assembly to threaded fitting from which you removed blind nut.

(c) Remove sealing cap on end of charging valve.

(d) (1) Crack open valve by turning charging valve stem one half turn to the right.

(2) Replace sealing cap. The pressure reading will now show on your gauge, provided the unit is operating. When unit is idle the gauge will show from Balance (or "0") to 5 lbs. of pressure. When unit is operating the gauge will show from 10 to 25 lbs. of pressure, depending upon the temperature of room. High temperature of room will show high pressure reading. In normal room temperature of 80° F. the pressure should not exceed 25 lbs. In low temperature room the pressure should be at least 10 lbs. while unit is operating. Air in system will show on gauge as high pressure. To relieve air from system open purge valve on top of expansion valve, observing gauge reading, closing purge valve when pressure recedes to 15 lbs. However, this pressure will slowly build up to between 15 and 20 lbs., which is normal, but if pressure again builds up to exceed 25 lbs. repeat the operation.

Three operations as above should relieve air in the system. If pressure continues to build up after the three operations you may know that you have a leak on low side or vacuum side of the system.

(e) Remove sealing cap from end of charging valve and turn charging valve stem all the way out (to left) until it seats firmly.

(f) Replace sealing cap on end of charging valve, using *new* lead gasket.

(g) Remove gauge assembly and replace blind nut on threaded fitting in front of charging valve.

Liquid Levels

By liquid levels we mean the amount of ethyl chloride that is in the system; either the system has the proper charge, is undercharged or is overcharged. Following are the conditions by which you may determine the liquid levels.

Proper Charge

When the system is properly charged and operating the evaporator (chilling unit) will be completely covered with frost; this frost will also extend out from three to six inches on the suction line (⅜-in copper return line on top of evaporator).

Under Charge

When the system is undercharged and operating, frost will accumulate on the evaporator (chilling unit) only as far up the sides as the liquid level within the evaporator (chilling unit). (See "Adding ethyl chloride to the system.")

How to Service Units Using Ethyl Chloride

Practical service information on ethyl chloride machines, a digest of service instructions on the Allison refrigerator, is presented with this issue of the News. This includes gauge readings, charging, various testing operations and adjustments, and typical service calls and their remedies.

A detailed description, with diagrams, of the machine was given on page 24 of last week's issue of the News. For the complete picture of service on this machine, it is suggested that service men peruse both articles carefully.

Over Charge

When the system is overcharged and operating, the evaporator (chilling unit) will be completely covered with frost, also the frost will extend out and down suction line (return line), in some cases as far as the compressor, depending on the amount of overcharge.

To obtain proper liquid level in the case of an overcharge, purge valve at top of expansion valve for a period of 2 to 5 seconds, and allow ethyl chloride *gas* to escape.

Care should be taken in this operation not to allow too great an amount of ethyl chloride to escape. Purging should be at intervals of 15 or 20 minutes to allow liquid level adequate time to adjust its position.

CAUTION: *Do not allow liquid ethyl chloride to escape from purge valve.*

Adding Ethyl Chloride to The System

When you have determined that the system is not operating efficiently, due to an under charge of ethyl chloride, the following operations should be carried out:

(a) Be sure that all connections are drawn up tight, and that purging valves are closed (Stem turned all the way to right.)

(b) Remove blind nut on charging valve and connect one end of charging tubing to this fitting. Connect other end of tubing to the service charging drum.

(c) Remove sealing cap from end of charging valve and turn valve stem all the way in (to right) until it seats. Replace sealing cap to prevent liquid leaking out of end of valve.

(d) Suspend service charging drum in a vertical position with outlet facing downward, at an altitude higher than expansion valve.

(e) Open valve on drum about three full turns and allow the liquid ethyl chloride to flow through charging valve and up into expansion valve.

(f) Open purge valve on top of expansion valve to allow the air and a small amount of gas to escape. (This air, if not purged out of expansion valve, will not permit sufficient ethyl chloride to enter the valve and actuate the float ball.)

(g) To determine if liquid ethyl chloride is entering evaporator (chilling unit) place your ear near evaporator; if liquid is entering evaporator, you will hear violent boiling. (Do not, at any time, leave the purge valve open when liquid is escaping. Purge off *only gas or air.*)

(h) Allow liquid to enter evaporator for about two minutes, then shut off valve on service charging drum by turning valve stem to right until it seats firmly.

(i) Remove sealing cap on charging valve and turn valve stem all the way *out* (to left) until it seats firmly.

(j) Allow the machine to operate for a period of from 15 to 20 minutes, and observe the liquid levels as shown on the evaporator. If evaporator does not become completely covered with frost, repeat the above operation. If the evaporator does frost over, the liquid level is right; and in this case proceed as follows:

(k) Remove charging tubing from charging valve (beneath condenser).

(l) Attach pressure gauge assembly to the same connections used for charging tube on charging valve.

(m) Crack charging valve stem open ½ turn to right, and observe gauge reading for 45 minutes.

(n) Replace sealing cap on charging valve. *Have this cap tight during 45 minute gauge observation period.*

(o) Start machine by inserting service cord in electric circuit and pushing down on lever of sentinel breaker.

(p) Do not permit pressure to exceed 25 pounds. (Purge gas or air from expansion valve if pressure exceeds 25 pounds.)

(q) At expiration of 45 minute operation, if pressure is correct, remove sealing cap on end of charging valve and turn charging valve stem all the way out (to left) until it seats firmly.

(r) Replace sealing cap using *new lead gasket.* Remove gauge assembly and replace blind nut on fitting of charging valve.

Testing Expansion Valve

To determine if expansion valve is leaking, attach pressure gauge, close charging valve (to right), stopping machine after the valve is closed tightly. If pressure returns to zero position *slowly* the expansion valve is leaking.

Expansion Valve Stuck Open

To determine if expansion valve is stuck open, attach pressure gauge, close charging valve stem (to right), stopping machine after valve is closed tightly.

If pressure returns to zero position rapidly, valve is stuck open. The rapidity of the return to zero position on gauge is dependent on how wide the valve is stuck open.

Expansion Valve Stuck Closed

If expansion valve is stuck closed a pressure will build up in the system, and the sentinel breaker will automatically cut off. Purge valve.

In starting machine, plug electric cord in baseboard receptacle or lamp socket, and push down lever on sentinel breaker which is mounted on right end of condenser shroud. Be sure themostat plug is making contact on terminals of thermostat.

Be sure that cooling fan back of condenser coil is operating. This can be determined by placing a small piece of paper against the condenser. If fan is operating, the suction will hold the paper firmly against the condenser. If fan is not operating, stop unit by pushing up lever on sentinel breaker; remove panel in rear of fan shroud and adjust fan to give blades proper clearance. If fan now operates push down sentinel breaker, starting unit again.

Remove filler which is bolted to baseboard, back of motor unit, and place this filler in bottom of ice tray compartment of chilling unit (evaporator). The two lower ice trays must rest on this leveling plate.

Inspecting Oil Pressure in Compressor Dome

(a) Shut off machine and allow it to remain idle for about 10 minutes.

(b) Replace oil plug on compressor dome.

(c) Use wire in measuring oil level.

(d) Fill dome with oil until it overflows through oil filling hole.

(e) Replace oil plug, *using new lead gasket.*

(f) Place gauge assembly on machine. (See gauge readings.)

(g) Purge air out of system.

(h) Remove gauge assembly. (See gauge readings.)

Service Calls

Service calls on the Allison electric refrigerator may be listed under the following numbered general heads. These heads consist of various complaints of existing conditions in the field.

Call No. 1

The refrigerator seems to be cold enough, chilling unit is frosted, water freezes fast enough, but his Allison runs too much or it runs all the time.

Causes

(a) Undercharge of ethyl chloride. (See liquid levels.)

(b) Overcharge of ethyl chloride. (See liquid levels.)

(c) Poor conditions surrounding condensing unit.

Condenser fan stuck.

Poor circulation of air.

(d) Compressor not up to speed.

Low voltage. (Check up on line voltage to be sure it corresponds with motor rating.)

Overload. (Too high pressure, air in system.)

(e) Poor conditions of, or, surrounding refrigerator.

Refrigerator in too warm a location.

Too warm foods placed in refrigerator.

Refrigerator doors left open too long.

(f) Thermostat not operating properly.

Thermostat line shorted.

Call No. 2

The machine runs all the time; ice does not freeze and evaporator is not even cold.

(a) Undercharge of ethyl chloride. (See liquid levels.)

(b) Expansion valve not functioning properly.

Call No. 3

The machine does not freeze ice cubes or cannot freeze them fast enough.

Causes

(a) Undercharge of ethyl chloride. (See liquid levels.)

(b) Thermostat not cutting in and out properly.

(c) Warm water:

If warm water is put in trays, the time necessary to freeze will be increased.

(d) Kind of water used:

The water used may contain a high percentage of impurities, which will lower the freezing point of the water. (In sections where this condition exists, recommend the use of distilled water or spring water.)

Call No. 4

The machine operates only a few minutes and remains idle only a few minutes. (This is a short cycle.)

Causes

(a) Door leakage.

(b) Defective thermostat.

(c) Poor air circulation inside refrigerator. Obstruction of openings between the food compartments, or to the evaporator compartment.

(d) Too much frost on evaporator (chilling unit). A heavy coat of frost on the evaporator (chilling unit) will block the free circulation of air in the evaporator compartment; and also will act as an insulator. This insulation of frost will prevent the transfer of heat from the air to ethyl chloride within the evaporator (chilling unit).

Call No. 5

The refrigerator freezes ice cubes, but refrigerator is not cold.

Causes

(a) Door leakage.

(b) Poor air circulation inside refrigerator. (See call No. 4.)

(c) Too much frost on evaporator (chilling unit). (See call No. 4.)

Call No. 6

Customer claims Allison is noisy.

Causes

(a) Loose fan motor shroud.

(b) Shipping washers and bolts have not been removed.

(c) Refrigerator is not level.

(d) Refrigerator set against walls or partitions.

(e) Lack of oil. (See "inspecting oil level in compressor dome.")

(f) Chattering check valve. (See "charging check valve.")

(g) Refrigerator placed on hollow wood floor.

Call No. 7

The refrigerator does not operate and is warm.

Causes

(a) Defective "Sentinel" breaker.

(b) Burned out motor.

(c) Air in system. (See locating leaks.)

When air enters system it builds a pressure higher than the normal operating pressure of the unit. When this pressure reaches a predetermined point the breaker automatically cuts off the current, and the breaker lever will be found in the "off" position (up).

(d) Hubble plug on thermostat cord disconnected from terminals of thermostat. Replace plug.

(e) Electric fuses on refrigerator circuit blown out. Replace fuses.

Call No. 8

Customer claims food compartments are cold enough, but ice will not freeze.

Cause

When this condition exists we have what is termed "natural refrigeration." In other words, the temperature surrounding the refrigerator is equivalent to the temperature we maintain in the refrigerator for the preservation of food and naturally the machine does not operate as long and often, resulting in "too long a time to freeze ice cubes" or "no ice cubes."

Call No. 9

Customer claims Allison operates all the time and foods are frozen.

Causes

(a) Defective thermostat.

(b) Short circuit in thermostat cord.

(*Concluded on Page 19, Column 3*)

FITTINGS

A simple word, not indicative in the slightest degree of the importance that fittings play in the business of automatic refrigeration.

Nothing in the word to signify that if the connections used are imperfect, the whole system is a failure. Not a suggestion in the name telling how necessary it is that fittings be "built right to stay tight" yet everybody in the business knows that good fittings *must* be made that way.

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We specialize on the production of every type fitting needed for refrigeration. We carry an immense stock of standard items and can make shipments of uncommon tube and pipe combinations without delay.

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Students of Utilities Engineering Institute, Chicago, take a two-weeks shop training course at institute headquarters at the conclusion of the 48-lesson home study course.

* * *

48 Lessons & 2-Weeks Shop Work Make Up Training Course

Utilities Engineering Institute Helps Students Find Jobs And Offers Free Consulting Service to Graduates

By Elston D. Herron

CHICAGO—There's a big "No Help Wanted" sign waiting for the average run of electric refrigeration service men out job-hunting these days. But for real technicians who know what they're about—who can do any service job quickly and perfectly—the market today is unlimited.

Of course, that's just one man's opinion—he being E. P. Sorensen, who, as president of the Utilities Engineering Institute here, makes the wheels go 'round in its offices and shops to train service men by the correspondence method. Right now, 1,500 are taking the course.

The institute was started in 1927, and enrollment has jumped about 25 per cent every year since. Guiding lights in its foundation were F. P. Siebel and F. P. Siebel, Jr., of the Siebel Institute of Technology in Chicago, which gives courses and consulting service in brewing and baking, with supplementary courses in cold storage and ice making.

Select Students

Your reporter spent the greater part of a day at the Utilities headquarters, learning how a student is enrolled, and what he gets for his $110 ($125 if he uses a deferred payment plan) in the way of training for service or refrigeration engineering work.

The institute once accepted anyone who applied for the course and had the money to pay for it. Now, the school has 35 representatives traveling about the country to contact prospective students, make sure the latter are qualified, by previous schooling or work, to handle the course.

If it appears a prospect is not likely to learn much from the course for one reason or another, he is rejected. If it is impossible for a prospect and a district representative to contact each other, the former is asked to fill out a questionnaire by which his eligibility is determined.

It isn't because of a noble spirit that Utilities Engineering Institute sometimes tells an applicant he would be wasting his money to take the course. It is simply good business. Said Mr. Sorensen:

"If we took just anyone in here, and turned out incompetent graduates, it wouldn't be long until we were classed along with a lot of other correspondence schools—as a good racket to sell printed matter at a fancy price.

"But if we keep on making rejections, admit only students who will learn something and be a credit to us after their course of study, we'll profit in the long run. This is no different from a regular college or university, except that we're trying to make a profit."

When a student has been accepted for the training course, he is sent the first of 48 lessons, which cover the subject of refrigeration as to principle, types, component parts, calculation, installation, maintenance, etc.

Following are a few of the lesson headings: Refrigeration principles, properties of refrigerants, compressor types, machine layout, pipe and tube fittings, reading blue prints, multiple and remote installations, cabinet construction, the electric motor, electric wiring notes and rules.

Each lesson is 10 to 12 pages long, and the 48 lessons together make a book three or four inches thick. Most students finish the course in from 5 to 10 months. At the end of each lesson is a list of 10 questions and problems which must be answered satisfactorily before a student starts work on another phase of the study.

When the answer sheets arrive at the institute in Chicago, they are checked and graded by a staff of workers, then turned over to the head of the instruction department who okays the grades, attaches any necessary comment or criticism, then returns the sheets with a mimeographed form on which model answers to the questions are given.

Some of the Problems

Here are some typical questions:

Lesson 27. A butcher's refrigerator measures 6 feet high, 3 feet wide, and 10 feet long. The cooler is insulated with 4-inch corkboard, and there are three windows of triple glass that are each 3 feet square. The inside of the refrigerator is to be kept at 40° F., and the plant is located in Michigan. Find the leakage load in B.t.u. per 24 hours and per hour.

Lesson 44. Where should the condenser be installed when there are cooling units above the point that the pressure will force the liquid?

Lesson 43. (a) What defect and (b) what adjustment of the expansion valve will cause the suction line to frost?

Lesson 38. The brine temperature is 20° F., the refrigerator temperature is 50° F., and 60,000 B.t.u. are removed in 24 hours. The diameter of the pipe is 1½ inches. How many feet of brine coil will be required?

Lesson 35. What is the smallest size pipe advisable with a circulating type of drinking water system?

Accompanying each new lesson is a letter from the instruction head, explaining how it should be studied, what particular significance it has in the training of a service man.

'Job Ticket' Instruction

When a student has completed the first 24 lessons of the course, he is sent a packet of "job tickets," each of which is a little manual giving step-by-step instructions for doing one specific job of refrigeration repair work. These job tickets merely tell how to apply what the student has supposedly learned in the first half of the course.

With the tickets to help him, the student is competent, says Mr. Sorensen, to go out soliciting some types of service work, and from the latter he receives not only some practical training, but a small income to use in paying for the course of study.

Not all students use this supplementary service, the president says. Students making widest use of it are those buying the course on the deferred payment plan, who need extra money if they are to finish the last half of the training.

To help students who have started service work while still taking the course, and graduates, too, the institute offers free consulting service on any special problems confronted. Personal answers are made by one of the staff engineers. The following, which arrived from Kenosha, Wis., while the NEWS reporter was watching the paper-grading process, gives an idea of the kind of questions asked:

"I am in contact with a Norge that while it is running, the lights act as if they were on a 25-cycle current instead of 60-cycle. I can see nothing wrong with the machine, and have come to the conclusion that the wires through the house are too small to carry the load. Does my diagnosis sound correct?"

There is no final examination at the end of the 48 lessons. A two-weeks course in shop practice takes its place. There is no extra charge for this work, although students must pay their transportation to Chicago and their living expenses while there. (A second shop is being established in New York City at 1841 Broadway.)

Shop Training

The two-weeks period is divided between actual work in the institute shops and classroom discussion, led by Dillon Burroughs. Twenty-three jobs must be performed to complete the shop course. They are as follows:

1. Make up fitting board. 2. Perform soap bubble test using oil. 3. Test for SO_2 leaks, using ammonia. 4. Test for CH_3Cl, using halide leak detector torch. 5. Make up electrical circuit on board. 6. Check motor. 7. Draw diagrammatic sketch of Zerozone electrical hookup. 8. Tear down condensing unit (Zerozone) as per typed instructions. Spray compressor. 9. Clean up cooling unit as per typed instructions. 10. Charge unit through low side. Check pressures and set expansion valve. 11. Take apart and test (a) low side float (b) high side float. 11a. Purge air from system. 12. Pump machine down into drum. 13. Recharge through high side of system. 14. Charge and set thermostat. 14a. Add one ounce of oil to compressor. 15. Pump charge into liquid receiver and disconnect cooling unit. 16. Put machine back into operation. 17. Pump down high side float system, into drum. 18. Charge high side float system. 19. Pump down low side float system. 20. Charge low side float system. 21. Set low side pressure control on Servel, Frigidaire, Kelvinator. High side also. 22. Remove compressor valve stem, clean, and replace. 23. Install line strainer on Zerozones.

Approximately half of all students taking the complete home study course come to institute headquarters for shop practice, according to Mr. Sorensen. Thirteen men were there when your reporter visited it. They had come from nine cities—Tarentum, Pa.; Creston, Ohio; Buda, Ohio; Chicago; Fairport Harbor, Ohio; Mason City, Iowa; Andover, N. Y.; Niles Center, Ill.; and Dorcester, Wis.

Equipment in Shop

Equipment in the shops is valued by Mr. Sorensen at $4,000. It consists of:

Test room and constant temperature room, thermostat testing outfit, float testing apparatus, expansion valve testing outfit, seal testing equipment, calorimeter, cooling unit test cabinets, charging booths, paint sprayer, submerging tanks, converter, run-in rack, vacuum pump, equipment using high- and low-pressure refrigerants, and typical domestic, commercial, multiple, milk cooler, and brine tank installations. Most of the condensing units used in the shops are Zerozones.

The institute makes no guarantees to its students about getting them jobs after they have finished the course of study. It does, however, make an effort to locate them satisfactorily.

In its files it has names of the larger refrigeration outlets in many cities. To the outlets in the graduate's locality it sends a letter, saying that Mr. Doe has just completed the Utilities study course, and will call to inquire about an opening. The graduate is notified as to the concerns which have been sent these letters, and is told to call there immediately. And he is coached as to how to conduct his interview.

Twenty-one people are employed at the school's headquarters in Chicago. Some of the key men are those in the instruction department: R. L. Hendrickson, its head, for 11 years with Servel and in his own service business; C. E. Hamilton, formerly a refrigeration contractor; Mr. Von Kampen, formerly with two Chicago service organizations. Mr. Siebel, Jr., is chief engineer of the institute, but now only in a supervisory capacity.

Service Data for Allison Machine

(*Concluded from Page 18, Column 5*)

Call No. 10

Machine running excessively hot.

Causes

(a) Low on oil. (See "inspecting oil level in compressor dome.")

(b) Condenser fan not operating.

Locating Leaks

Do not use anything except flashlight in locating leaks.

High Side Leaks

High side leaks may be determined by the ethyl chloride leaking out of the system. To find leak:

(a) Place gauge assembly on machine and open valve for readings.

(b) *Loosen* ⅜-in. copper tubing nut on inlet of check valve allowing air to be drawn in through compressor, but do not remove tubing.

(c) Start motor.

(d) Do not allow pressure to build up over 50 pounds. To prevent excessive pressure crack purging valve slightly at expansion valve.

(e) While machine is in operation test all joints and parts located on high side of system with soapy water or light grade of oil.

(f) When leak is located shut off motor.

(g) Wipe all oil or soapy water off connections and parts.

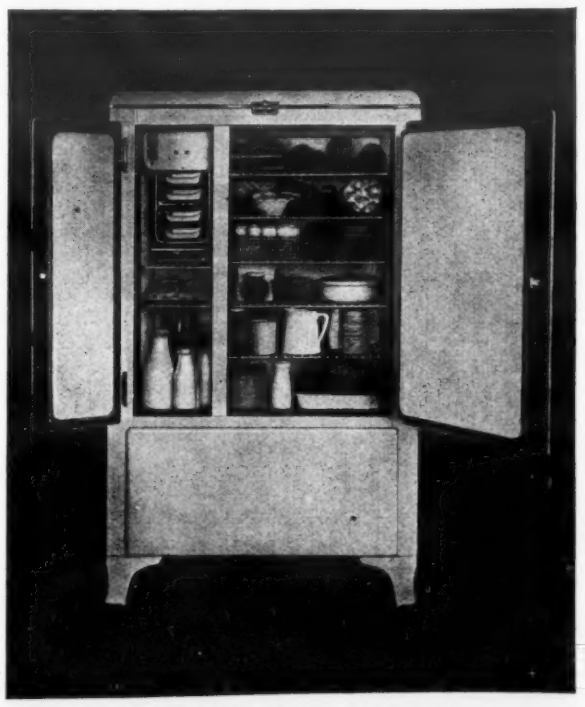
(h) Repair leak.

(See "adding ethyl chloride to the system.")

Low Side Leaks

A leak that may develop on the low side of the system, may be termed as an air leak and will give a high pressure reading on the gauge.

By turning the charging valve all the way to the right, and closing off the condenser, the air that is pumped into the system goes direct to the expansion valve. By jarring the expansion valve at the bottom hard enough to allow the valve to open, air will flow into the low side of the system. Keep same operation up until you are satisfied there is a good pressure in the low side of the system; then test all parts and connections until leak is located.



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NRA Consumers' Advisory Board Seeks to Have Standards of Ice Box Construction and Performance Included in Ice Industry Code

Danger to Public Health Seen in Poorly Constructed Ice Refrigerators; Board Would Have Performance Standards Placed on Name Plate

Editor's Note: The following is reprinted from "Report No. 5 by the Consumers' Advisory Board's Special Adviser on Quality Standards."

THE health and livlihood of the entire population depends upon the cleanliness, purity, and quality of its food. A public obligation is laid upon every party participating in the raising, processing, distributing and preparing of the national dietary to protect and promote the public health.

In the age of mechanical equipment when every step in this process depends upon the efficiency, reliability, and general performance of mechanical apparatus, the suppliers of shipping, storing, preparing, and preserving facilities are a necessary party to this compact. The public relies upon them just as they do upon the farmer, the "butcher, the baker and candlestick maker," while their business depends upon the quality of the service their equipment affords.

Refrigerators are the most important of all this vast and complicated machinery for bringing the world's food resources to the American table. Upon their proper functioning depends the quality and healthfulness of the meat, vegetables, dairy produce, and fruit consumed by nearly every citizen. *The quality of the refrigerator conditions the health of the nation.* By the same token, the manufacturers and distributors of refrigerators have roles similar to doctors who write prescriptions for patients. They must have standards of performance for their equipment just as doctors have standards of workmanship and standards of ethics.

Refrigeration is of two classes: ice and mechanical. In the domestic household, both are widely used. Ice boxes are typically the cheaper and least expensive of the two. For that reason likewise, standards of performance are especially important in this section of the refrigeration field.

It is a rule in the medical, legal, and other professions that those who violate the publicly recognized confidence of their constituents shall be compelled to mend their ways or be driven from their practices.

It is a rule under the Codes of Fair Competition that the honest shall be promoted and the dishonest driven out, the ethical supported and the unscrupulous suppressed. Good, efficient, cheap, and health-insuring ice-boxes can and are being built. Likewise some very bad ones are being delivered to consumers.

In making these recommendations calling for establishment of minimum performance standards for ice refrigerators the Consumers' Advisory Board is asking that immediate steps be taken to eliminate the latter, and to support the former type of producer. This is in line with the spirit and specific intent of the "New Deal" to the American public, and should be taken as an effective endorsement of the better elements in this industry and at the same time as an approving echo of those many statements made by the President of the United States and the Administrator of the NIRA, which has been so forcibly called to the attention of business enterprise that its first and foremost duty is ultimately to consumers.

(This report was circulated in draft form to a number of well recognized authorities in the field in question, and, in its present form, represents, in the opinion of the Consumers' Advisory Board, a condensation, collation, and summarization of the best and most impartial technical and consumer fact and opinion available.)

Recommendations from the Consumers' Advisory Board of the NRA for the Revision of the Household Ice Refrigerator Code

(The practice of manufacturing refrigerators which provide performance of inferior quality due to material and construction and selling these as a first quality commodity and at a first quality price is very widely practiced by the less reliable manufacturers in the Industry. Certain minor undesirable practices are also prevalent.)

1. Factors Which Determine Refrigerator Performance, And Thereby Promote Consumer Satisfaction

A. Temperature Which the Refrigerator Will Maintain

Research has revealed that in order to retard excessive bacterial growth and spoilage in food and thereby guarantee satisfactory performance, it is desirable that a refrigerator maintain a temperature not to exceed 45° F. in the milk compartment and an average temperature not to exceed 50° F. in the food compartment, over a 24 hour period. Such refrigerators are obtainable on the market today.[1]

Charts issued by the Bureau of Home Economics indicate that the following temperatures are necessary to preserve various foods:

Milk, milk dishes, butter, broth, desserts	Not over 45° F.
Uncooked meats, poultry, covered jars for salad material	Not over 47° F.
Berries, cooked meats	Not over 48° F.
Cooked vegetables, eggs, fats, left-overs	Not over 50° F.
Fruits and vegetables	Not over 52° F.

The following figures are taken from the same charts: The bacterial count of milk kept for four days at 40° F. rose from 9,000 at the end of the first day to 34,000; if kept for four days at 45° F. it rose from 13,000 to 270,000; for same number of days at 50° F. it rose from 39,000 to 390,000, milk held at 60° F. for four days contained at the end of the first day 110,000 bacteria, and this number increased to 3,100,000 after four days. The initial bacteria count for all samples was 2,300.

No conclusion as to the definite point at which the number of bacteria becomes dangerous to health can be reached since various variable factors make it impossible to set such a definite count. It is a well-known fact that many types of bacteria are not harmful, and therefore, it is necessary to guard against misunderstandings and misapplications in basing any study of food preservation at stated temperatures on bacterial counts.

One of the most important factors in this whole matter of food preservation, bacterial counts, etc.,—and one which is frequently overlooked—is the length of time that food is actually kept in a refrigerator.

Ice and Refrigeration, 1929, contains this information: That there is a definite relationship between Time and Temperature; if milk is to be kept for only 24 hours, a temperature of 50° F. is sufficient, but if for a longer period a temperature not to exceed 45° F. is essential.

B. Cost of Operation

Factors entering into low operation costs.

(1) Adequate insulation.

(2) Close fitting doors and tight catches. (A very important factor in keeping down operating costs.)

(3) Ice compartment in proper ratio to the food storage space.

(4) Rigid and durable construction.

(a) A strong and rigid frame.

(b) A type of insulation which will not warp, slip, or settle.

(c) Protection of insulating material from moisture (where the need is indicated).

(d) A lining that will prevent the pentration of odors and moisture.

(e) Strong hardware which will not rust or tarnish easily. In warm and humid climates refrigerators with enamel or lacquered metal exteriors should bear a guarantee against rusting of the metal sheet.

C. Size of Food Storage Space

1. Simplified Practice Recommendation R109-29 has standardized to a large extent the dimensions of refrigerators—door openings and depths of ice compartments.

2. Some manufacturers use a "classified" system in grading their cabinets based upon the ratio of food storage space to ice capacity.

The chart listed below indicates the system now used by some manufacturers. (Chart from: *House Design, Construction, and Equipment*—Gries and Ford.)

Food Capacity and Ice Capacity in Classified Refrigerators

	A	B	C
Amount of Ice Pounds	Cu. Ft. Food Space Minimum	Cu. Ft. Food Space Minimum	Cu. Ft Food Space Minimum
100	8	6	5
75	6	5	4
50	5	4	3.5

These figures are based upon the presumption that the average temperature in the milk compartment will at no time exceed 45° F.

D. Durability of Ice Refrigerators

1. *Reputation of the manufacturer or the dealer*—In the past the purchaser could buy a refrigerator only on the basis of the manufacturer or retailer's reputation. This basis would be perfectly satisfactory if it were *not* for the fact that it is extremely difficult for the purchaser to learn the real truth when it comes to judging the reputation of any producer or dealer. This basis has failed to protect the consumer. Without some standardization dealers are unable to enlighten purchasers as to durability or any of the other facts to which the consumer is entitled.

2. *Warranties*—The subject of all long-time guarantees, always a controversial one, need not be taken up here. The purchaser usually pays dearly for such long time guarantees, and in many cases nothing specific is warranted. Any true and enforceable warranty is a benefit to consumers and is worth paying for.

E. Insulation

Insulation is the most important factor of these five listed and is tied up very closely with all of the other four. The insulation is so built into a refrigerator as to completely conceal it from the eyes of the purchaser. No reasonably adequate system of grading or labeling ice refrigerators is in force today.[2]

Advertising claims and such grading as is practiced by manufacturers must merely not violate the provisions of the Federal Trade Commission Act. Many manufacturers use no general or uniform system for classifying or grading the insulation used in their product, and it must necessarily be concluded that the price charged for such refrigerators is then no criterion of quality. Purchasers are unable to make intelligent judgments as to quality on a price basis.

In short, few manufacturers or refrigerators make any effort to inform purchasers as to the amount or type of insulation used in the cabinet.

2. General Interest in Standards

1. The United States Bureau of Home Economics, and the American Society of Refrigerating Engineers jointly sponsored a project under American Standards Association procedure; which was begun as the result of a request by the American Home Economics Association that a conference be called, to establish standards for refrigerators. (Some years before the American Institute of Architects had tried to have standards established.) Due to the efforts of these sponsors the American Recommended Practice Code for Testing Domestic Refrigerators Using Ice, was worked out under a procedure prescribed by the American Standards Association. (Committee B-38cl-1931).

2. There is some evidence that manufacturers of ice have urged the ice refrigerator manufacturers to improve their standards.

3. Manufacturers themselves have taken an interest in this matter since the advent of mechanical refrigeration.

4. The American Home Economics Association has interested itself in attempting to have minimum performance standards established by the industry for the general information of purchasers. This group considers "the household refrigerator. . . as an important item of equipment in the household definitely related to the health and economic welfare of the family. The value of the refrigerator in the household is definitely related to its performance and service—to whether or not it will under normal conditions of operation, maintain a temperature low enough to inhibit the growth of bacteria which cause deterioration of food."

5. The National Association of Ice Industries through Dr. Mary E. Pennington, has accomplished much good work in the past in this field of grading ice refrigerator cabinets. Dr. Pennington is a pioneer in this field. Unfortunately all too much of the standardizations accomplished has not been passed on as a benefit to the consumer.

3. Standards Extant

1. Simplified Practice Recommendation R109-29—Refrigerator Ice Compartments — issued by the National Bureau of Standards, has done much in the way of standardizing the dimensions of refrigerators.

2. The American Society of Refrigerating Engineers and the United States Bureau of Home Economics have already completed part of their work sponsoring a Code for Testing Domestic Refrigerators (already mentioned in this report). The Code for Testing Domestic Refrigerators Using Ice has been approved by the American Standards Association and is indexed in the Library of the ASA as B-38 cl—1931.

3. Federal specifications on insulating material. The United States Government has specifications on corkboard, granulated cork, and fibre insulating boards. They are indexed HH-C-561, HH-C-571A, and LLL-F-321. These specifications merely define the quality of the insulation itself, but in that respect have a bearing on the general construction of a refrigerator.

4. The "classified" grading system sponsored by the National Association of Ice Industries sets forth a very simple and definite minimum performance standard. The specifications behind these grades should be carefully reviewed and if satisfactory be made readily available to consumers, properly backed by an appropriate and easily understandable system of labels.

5. A modification upon this "Classified" System issued by a nationally known non-commercial research agency, investigating the subject for consumers. This particular standard is said to go further than the Classified System and seems equally applicable.

4. Research in Progress

The American Society of Refrigerating Engineers as well as the United States Bureau of Home Economics through the A.S.A. Procedure is still carrying on considerable work along this line. Through Sectional Committees B-38 of the A.S.A. work is still going forward; the scope of the Committee is stated below. A Standard Test Code for Domestic Refrigerators Using Ice has been developed by this Committee and further standards for ice refrigerators should be issued in the near future.[3]

Some of the progress made by Committee B-38 is apparent in the excerpt below from the minutes of a meeting of that Committee held in New York, on March 5, 1930. The following definite action was taken on this report by the Sectional Committee:

Voted: That it is accepted in the light of present information that, to limit chemical and bacteriological changes, the average temperature in the milk compartment should not exceed 45° F. and the rest of the food compartment the average temperature should not exceed 50° F.

Voted: That the cabinet should be effectively insulated and the insulation so installed and protected as to retain its efficiency.

Voted: That the construction of the box must be such as to provide for long life (durability) and continued efficiency, and that with this in view there be referred to Sub-committee 3 the problem of working out methods by means of which these factors may be predetermined by test.

Voted: That the refrigerator hardware must be of good quality, not tarnish or rust readily, and of a design that will hold the door tightly closed.

Voted: That the lining must be easily cleaned, durable, and tight.

Voted: That the box designations and capacities and dimensions of ice compartments as given in Simplified Practice Recommendation No. 109 of the Department of Commerce be accepted as standard.

Voted: That Section 2 of Sub-committee 2's report recommending shelf spacing as follows be accepted, viz.:

That no shelves shall be less than 5 inches apart, measured from the top of one shelf to the top of the next shelf, with the exception of shallow or half-shelves in the milk compartment. The minimum height of the milk compartment door to be 9¾ inches, with provision, where the milk compartment is more than 12 inches high, for half-shelves to be used for butter or meat. In the food compartment, the bottom shelf should be placed 10 inches above the floor with the other shelves not closer together than five inches. In the 50-lb. box a minimum of three shelves should be provided in addition to the floor, and variations in shelf spacing in accordance with the height of refrigerator dishes should be kept in mind.

There was no definite proposal as to the data on the nameplate.

Committee No. 1 wishes added to this a statement of ice meltage per cubic foot of usable space for food storage.

Committee No. 2 was unwilling to recommend such a statement, thinking it might be misinterpreted by the housewife.

It was agreed by all that no definite action could be taken on the nameplate until Committee No. 3 had reported a test code which could be accepted by the Sectional Committee.

One member of the committee stated that:

"It would seem desirable to indicate on the nameplate the nature of the performance rather than to have a blanket statement; this of course could be accomplished either by the actual statement of temperature or by statement of the grade that the refrigerator has met."

The committee further agreed:

(1) Consumer wants adequate amount of usable space therefore designate cubic feet food storage as well as ice capacity of the box.

(2) She wants some assurance that adequate temperatures will be maintained. This can be met by statement of temperatures reached under standard test conditions, including temperature conditions under which test was made. The temperature chosen for testing has been 75° F.[4]

2. The National Association of Ice Industries has done considerable research work and has established various grades for refrigerators on a B.t.u. basis. These are the so-called "classified" grades which were mentioned above.

3. The National Refrigerator Manufacturers Association has been asked to cooperate with Committee B-38. There has been no apparent cooperation in the true sense of the word. This Association unfortunately seems

(*Concluded on Page 21, Column 1*)

[1] While temperature limits other than those indicated in this paragraph and in the chart following may be practicable under certain conditions and in some homes, nevertheless, if food is to be kept in open containers for periods longer than 24 hours, the maximum temperatures listed are desirable if not even essential. In this connection Mr. Roe of the Electrical Testing Laboratories writes:

"In general it is desirable to operate refrigerators for the preservation of food at temperatures as low as practicable, but not too close to the freezing point of water. It has been found commercially expedient and relatively economical to operate household refrigerators with internal temperatures around 45° to 50° F.; that is to say, these conditions have been found practicable in many homes. They are undoubtedly impracticable in millions of other homes."

The last sentence is an opinion on which other authorities disagree.

[2] The National Association of Ice Industries has a grading system (referred to in IV 2.)

[3] A similar test code for mechanical refrigerators is being completed.

[4] Reliable expert opinion maintains that 75° F. is too low as a base for testing cabinets for use by consumers in the most populous parts of the United States.

Specifications for Ice Refrigerators

Specifications for ice refrigerators of three grades maintaining a temperature of 45° F. in the milk compartment and of 50° F. in the food compartment with an outside temperature of 75° F.
(Based on material published by the National Association of Ice Industries, except for items marked with an asterisk, which are the opinions of a person conversant with the subject.)

	Class A	Class B	Class C
Proportion of total space occupied by ice chamber	31-33 per cent*	33-35 per cent*	36-37 per cent*
Space available for food storage in—			
50-lb. size	5 cu. ft.*	4 cu. ft.*	3½ cu. ft.*
75-lb. size	6 cu. ft.*	5 cu. ft.*	4 cu. ft.
100-lb. size	8 cu. ft.	6 cu. ft.*	5 cu. ft.*
Insulation	2 in. pure corkboard faces covered	1½ in. pure corkboard* equivalent	1 in. pure corkboard* equivalent
Construction			
Outer sheathing	Wood or porcelain on steel	Wood	Wood
Inner sheathing	Vitreous porcelain or porcelain	Vitreous porcelain or well baked enamel on steel; corners rounded and all seams tight	Enamel on metal
Rigidity maintained by means of	Posts and braces to which inner and outer sheathings are fastened	Steel braces at corners and good construction	Good nailing at corners and proper stretchers

*Expressions of expert opinion are to the effect that corkboard is one of the best insulators but that some others serve equally well under certain conditions.

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ANSUL CHEMICAL CO.
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Consumers' Board Seeks to Have Standards Of Ice Box Construction Included In Ice Industry Code

(*Concluded from Page 20, Column 5*)

to feel that efforts to standardize or grade ice boxes are being made twenty years too late. (The Consumers Advisory Board agrees to, but in no way accepts, this statement as an agreement against such efforts at this time.)

5. Adequacy of Existing Standards

There is no consumer objection to the standards which exist, but they are fragmentary and do not directly cover consumer's needs. Of the 1,397,000 refrigerators sold in the year 1931, 432,000 were ice refrigerators. For many of these there is no standard specification which would provide a product of reasonable quality for the consumer. The purchaser is not informed in any manner as to the performance and durability of his refrigerator or of the amount or type of insulation used, or its efficiency in retarding the heat flow into the box.

In view of the lack of such information, some standards clause should be made a part of the Code of Fair Competition for this industry and enforced through the code procedure.

6. Project to Develop Consumer Standards

The American Home Economics Association has been working to stimulate the development and general use of such standards as will guarantee the consumer a reasonable product for his money. This Association has been active in attempting to have inserted in the Code of Fair Competition for the Household Ice Refrigerator Manufacturing Industry certain provisions providing for the establishment of minimum standards of performance and for several grades above this minimum standard.

Further, this Association wishes to see every refrigerator properly labeled as to manufacturer's name, usable storage space, ice capacity, the average temperature maintained under standard conditions, the amount of ice required to maintain the temperature under these standard conditions over a 24-hour period, a statement as to the durability of the refrigerator for the length of time during which it will maintain, under normal conditions of use, and the temperature as given on the name plate. This program has been carried on in considerable detail and some good results are apparent. This is a promotional effort to further the American Standards Association Committee work.

The program of the American Society of Refrigerating Engineers and the Bureau of Home Economics is stated below. They have jointly sponsored Sectional Committee B-38 under the American Standards Association, which originally attempted to establish Standards and Specifications for the Refrigerating Industry by following the program quoted here:

"Inside cubic contents; area and spacing of shelves; dimensions of ice doors; cooperation with the Division of Simplified Practice in establishing outside dimensions; the development of such standard methods of test as will be necessary to establish the data required in determining the rating of refrigerators; specifications covering the more important data essential to the rating of refrigerators and appropriate for inclusion on a nameplate defining the leading characteristics of the box; the setting up of standard grades or qualities for refrigerators; due consideration of questions of ruggedness and durability.

"Such standards and specifications are to apply to refrigerators cooled with ice and to self-acting or mechanical refrigerators employing a self-contained refrigerant."

No definite standards were established but rather the Test Code for Domestic Refrigerators Using Ice has been issued by this Committee.

7. The Code Hearing

The Code for the Household Ice Refrigerating Industry was approved by President Roosevelt Dec. 30, 1933. The following Recommendations of the Consumers' Advisory Board were accepted and incorporated into the code.

Article VI, Paragraph 12:

"It shall be the duty of the Code Authority to adopt and prescribe through the channels of the Association minimum standards of performance for each of several grades of ice refrigerators. In the development of such standards, the said Association shall cooperate with the Sectional Committee of the American Standards Association on Standards and Specifications for Refrigerators."

The Industry also incorporated the following provision under Article VII; Section 18:

"Each manufacturer shall tag or brand each ice box showing usable storage space (stated in cubic feet), and the ice capacity stated in pounds."

Credit for the insertion of these two provisions, in a large measure, must be attributed to Miss Alice Edwards of the American Home Economics Association. Acceptance of her suggestions discloses the fact that the refrigerator manufacturing industry itself is possibly beginning to realize the importance of this matter of establishing minimum standards of performance for their product. However, storage space and ice capacity are almost inconsequential as compared with refrigerative performance.

Under Article VII, Trade Practices, the first two sections must be heartily approved so far as they go. They prohibit the false marking or branding and the misrepresentation or false or misleading advertising of the products of the household ice refrigerator industry. They merely prohibit the giving of false information; they do not specify that any specific information be *supplied* to the customer.

Further recommendations by the Consumers' Advisory Board were made through Miss Edwards and are listed below, and ask that it be considered an unfair trade practice to fail to attach to any household refrigerator produced by the industry a name plate which states:

1. The name of the manufacturer.
2. The average temperature maintained under standard test conditions in the milk compartment and in the food compartment.
3. The amount of ice required to maintain the temperature under standard test conditions over a 24-hour period.
4. A statement as to the durability of the refrigerator or the length of time which it will maintain under normal conditions of use the temperature given.

The industry felt it inadvisable to accept these until further study and research had been made.

8. Minor Undesirable Practices

The Code of Fair Competition for the Industry, it is believed, will not eliminate some of these undesirable practices. Chief of these is the outdated system attempted by the industry for comparing or fixing their prices. For example, the "superficial foot," basis of pricing long used in the industry is of questionable worth under any circumstances.

Many unreliable statements are made in the advertising of some refrigerator dealers. It has been said by one expert that the consumer, when he buys an ice refrigerator from the average dealer, is running as great a chance of being deceived and he is when buying a second hand 1920 automobile from an unknown used-car dealer.

9. Expression of Opinion

A summary of opinion and discussion on this subject shows that this industry, due to the fact that it faces vigorous competition from mechanical refrigeration, must depend for its continued existence upon making every effort to meet the needs and desires of purchasers. Many people are denied adequate refrigeration due to high first costs and expensive upkeep, and these very people represent a potential market for the ice refrigerator industry and should be served by enterprising and efficient manufacturers.

It is estimated that $250,000,000[5] is spent annually on ice for refrigeration and that the annual expenditure per refrigerator is between $26 and $28. As has been pointed out before, insulation — adequate insulation — is of chief importance in holding down the cost of operation. It has been pointed out that good insulation is an investment which pays good dividends by its ice and food saving. An inferior refrigerator will melt about one-third more ice per day than a well insulated cabinet, and a poor cabinet will fail by 2° to 10° F. to maintain the proper low temperature afforded by the superior cabinet.

An extra one inch added to the thickness of corkboard used for insulation in a cabinet of 100 pound capacity, might increase its price by $20, but it will save about six pounds of ice per day by decreased meltage, and pay 18 per cent on the investment if only used six months a year.

It is believed that on this one point in particular—insulation—the industry has fallen down. Various authorities, the National Association of Ice Industries, The Bureau of Home Economics, and Consumers' Research, Inc., consider that a first quality refrigerator should have the equivalent of at least a two inch thickness of insulation—such insulation to be of high moisture resisting quality.

It is understood that no insulating material is fully water or moisture proof, but corkboard[6] is found to be one of the best materials obtainable, since it does not slump down easily and absorbs less moisture than most others. Various other granulated insulating materials are used, but are seldom too reliable. (Granulated cork, mineral wool, asbestos wool, etc.) First, they soak up water and moisture more readily and second, they slump down easily, thus giving a bad distribution in the insulation space.

It is uneconomic for consumers to buy unneeded ice the year round when they could buy insulation at a moderate cost once and for all. It is believed that a poorly constructed ice cabinet is more detrimental to the purchaser than the same poorly built cabinet utilizing mechanical means of refrigeration, because in the latter, insulation defects can be overcome by the mechanical compressor which will merely cost the consumer more in operating expenses.

Thus it is apparent that in the latter case food can still be preserved even if at a greater expense to the consumer, whereas in the former, food will spoil in spite of *all* efforts and expense. This makes adequate insulation a health consideration and a problem which all Public Health Authorities should consider carefully.

In a well insulated refrigerator, the material presented on page 293 of "House Design, Construction and Equipment" points out a temperature range of from 45.8° to 58.9° F. is obtainable (these temperatures are high for adequate refrigeration according to the best authorities); whereas a non-insulated refrigerator can only produce a minimum temperature of about 49° F. and the maximum temperature reaches 61° F. Ice in the latter type will melt about 15 per cent faster.

Inferior cabinets will not maintain a temperature sufficient to retard the growth of bacteria, thus directly causing food spoilage. Therefore, all refrigerators of first or even medium quality should be adequately insulated. In regard to the matter of insulation, it must also be pointed out that the doors should be tightly sealed. Seepage of cold or warm air through these spaces greatly reduces the efficiency and increases the operating costs.

The National Association of Ice Industries (The Better Homes Manual, page 373) maintains that:

"The modern refrigerator for ice should abandon the so-called 'dead air space' for insulation and substitute from one to three inces of pure corkboard or its equivalent and a 'baffle' between the ice compartment and the food compartment which guides the direction of the air movement."

"There should be available a section of the wall of every refrigerator sold that the purchaser may see for herself (1) the thickness and kind of insulator, (2) the entire absence of so-called 'dead air spaces,' (3) the presence, location and kind of water-proofing compound used to protect the insulation from moisture, (4) the reasonable use of paper to protect the surface of the insulator but not to be depended upon for insulation."

"The primary requirements in choosing insulators for household refrigerators are (1) high resistance to the passage of heat and (2) high resistance to the absorption of moisture such as is exhibited by pure corkboard." Therefore, the purchaser should insist upon knowing the name of the insulator and the thickness of it."

"When an insulator is wet—or even damp—heat can go through it easily. Therefore, a coating of some good water resisting compound, such as odorless asphalt, should be applied to all surfaces. If this asphalt binds the self-supporting insulator firmly to the interior lining on the one side and to the outer sheathing on the other, the insulator will be kept dry and stay in place for many years. Such construction, also is an efficient way of eliminating air spaces. Because of the difficulty in applying hot asphalt to such surfaces, heavy paper impregnated with odorless asphalt is often used to cover or wrap the slab of insulation."

While on this subject of water proofing the insulating material, one point should be brought out; a well known research laboratory, finds that toxic substances are sometimes used in this impregnating process[7]. One of the purposes of so impregnating the fibre or other insulating material used in the lining of these refrigerators is to make the cabinet insect proof. These toxic substances under certain conditions may form gases which are extremely poisonous. Therefore, this practice should either be eliminated or carefully regulated, preferably the former solution, the latter doubtless being an impossibility.

"In the middle of the floor of the ice compartment in the side ice refrigerator there should be an opening having an area at least one quarter of the total area. In refrigerators having from five to eight cubic feet of food space this cold air outlet is usually from six to eight inches wide and from 10 to 12 inches long.

"The next item to be sure of is that the air traverses completely the body of of it. A simple and efficient method of guiding the cold air is to extend upward and downward the partition which separates the ice compartment from the food compartment, and to put within this partition some insulator so that it is less cold than all metal would be."

"Such an extension is known as a 'baffle' and for the best results it should reach to within five inches of the floor and six inches from the top of the refrigerator in cabinets of larger sizes."

It is now mandatory upon the industry through their Code of Fair Competition to provide information as to the net food volume of any refrigerator cabinet. Previous to the adoption of the Code for this industry such information has not been too accurate, and such information cannot be made accurate in the absence of well defined and consumer understandable specifications and labels.

Opinion of the American Home Economics Association:

Due to the important position held by household refrigerators in the health and economic welfare of the family, it is believed that it should be made mandatory upon the Industry through a Code of Fair Competition or similar means, to place upon the nameplate of every refrigerator the following information:

1. Name of manufacturer.
2. The usable storage space (stated in cubic feet).
3. The ice capacity stated in pounds.
4. The average temperature maintained under standard test conditions in the milk compartment and food compartment.
5. The amount of ice required to maintain the temperature under standard test conditions over a 24 hour period.
6. Statement as to the durability of the refrigerator or the length of time during which it will maintain under conditions of use, the temperature as given.

In conclusion it must be noted that one very definite point was brought out by the industry at the code hearing: that their very existence depends upon producing a refrigerator to reach the ultimate consumer at a price a little in excess of $20. It was felt that the only means of meeting a competition of mechanical refrigeration was to place refrigerators on the market built to retail at such a figure.[8]

The President's conference on Home Building and Home Ownership (called by President Hoover) made the following recommendations in regard to "ice chests." The ice chest differs from the refrigerator in that there is no separate ice compartment, but that the block of ice is within the food storage space.

Ice Chests

"If the sum available for the purchase of a refrigerator is less than $20, the use of an ice **chest** is recommended. An ice chest is inexpensive and has long been recognized as having a higher degree of efficiency than the cheaper refrigerator.

"When purchasing an efficient ice-cooled **chest,** the customer should be sure that the walls contain at least 1½ inches of a recognized insulator, that the inside lining is of heavy galvanized iron, that a metal rack on the floor allows at least 1½ in. of unobstructed space below it for air movement, and that the ice compartment located at one end has a wall of heavy corrugated metal extending from about 2 inches below the top to about 2 inches above the rack on the bottom. There should be a drain with a water seal."

A well-qualified official of the National Association of Ice Industries (trade association) agrees that good quality cabinets with definite standards of performance can be retailed within or near $20 figure.

10. Recommendations

Paragraph 12, Section VI, of the Code of Fair Competition for the Household Ice Refrigerator Industry should be revised or implemented so as to provide for the following:

1. The Code Authority shall immediately set up a committee, so constituted as to give due representation to all special and general interest groups, including ultimate consumers and the government, to be charged with the duty of making a survey of the standards situation within the industry, and of recommending to the Code Authority standards for adoption covering quality, performance, and consumer understandable labeling systems. The consumer and government representatives should be appointed by the Administrator, the former to meet with the approval of the Consumers' Advisory Board, and the latter to represent the National Bureau of Standards of the United States Department of Commerce.

2. The report of the committee should be made jointly to the Code Authority and the Administrator within not more than six months from the date of its appointment. Minority opinion should have the right of report in the same fashion. Following review by all interested groups of standards recommended, the standards should be adopted and made mandatory within not more than three months thereafter, upon the industry by the Code Authority, provide that at no time should the right to manufacture and/or sell non-standard equipment to meet special needs be disallowed when properly labeled "non-standard" with the nature of the deviation from standard being clearly stated on the label.

3. Before, during, or at any time after making its survey and submitting its recommendation to the Code Authority and the Administrator, the Committee may remand any portion or the entirety of the problems delegated to its care to the procedure of the American Standards Association, the National Bureau of Standards, or any other standards promulgating body now existing or to be set up whose procedure guarantees adequate consumer and government representation for adoption as nationally valid standards, provided that such action be not construed as relieving the committee from responsibility for making a definite recommendation within the time interval indicated above. Under whatever procedure handled, the report made by the committee should be followed by adoption of standards recommended within not more than three months thereafter.

4. The committee should be given, following its original report, permanent status, with the duty of supervising the rephrasing, redrafting and compliance with the standard or standards adopted as needs within the industry and considerations of the market determine.

[5]Figure probably represents total annual consumption. Domestic expenditures on ice probably is represented by a large portion of this figure.

[6]Expert technical opinion does not dispute the reliability of corkboard as an insulator but maintains that various others might be equally as good under certain conditions.

[7]Information supplied by Consumers' Research, Inc.

[8]These facts taken from the Public Transcript of the Industry hearing.

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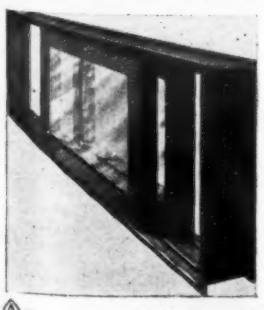

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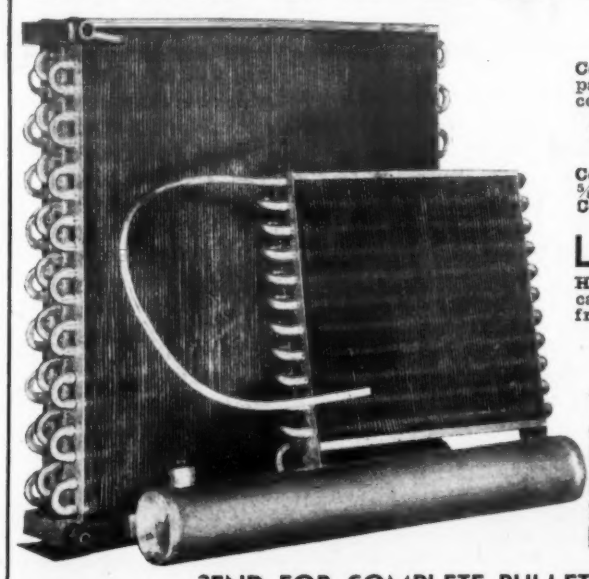

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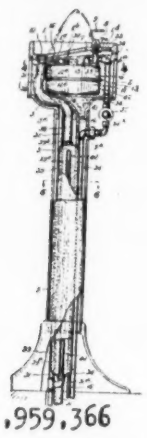
PATENTS

Issued May, 22, 1934

1,959,366. DRINKING FOUNTAIN. Herbert C. Kellogg, Detroit, Mich., assignor to Liquid Cooler Corp., Detroit, Mich., a corporation of Michigan. Application June 27, 1929. Serial No. 374,071. 4 Claims. (Cl. 62—141.)

1. In a drinking fountain, the combination of a receptor having a nozzle adapted to project a stream of water and a drain



1,959,366

opening for waste water; an evaporative water-cooling unit disposed beneath the receptor; supply and discharge pipes for liquid and gaseous refrigerant, respectively, connected to said cooling unit and adapted to be operatively connected with refrigerant liquefying means; iniet and outlet pipes for water to be cooled connected to said cooling unit, the water outlet pipe leading from the cooling unit to the said nozzle of the receptor and the water inlet pipe being adapted to be connected with a source of water supply and the connections of all of the said pipes with the cooling unit being at the top thereof; a drain pipe to which the receptor drain opening is connected; a casing structure surrounding the cooling unit and the adjacent parts of the said pipes, the receptor constituting a removable top wall section of the casing structure and the connections between the drain opening of the receptor and the drain pipe and between the nozzle of the receptor and the water discharge pipe being separable, whereby the top of the cooling unit and all of its connections can be uncovered for inspection and servieing by removal of the receptor from the casing structure.

1,959,389. ADSORPTION SYSTEM. Guy T. Shoosmith, Baltimore, Md., assignor, by mesne assignments, to Chester F. Hockley, receiver for The Silica Gel Corp., Baltimore, Md., a corporation of Maryland. Application July 2, 1931. Serial No. 548,466. 2 Claims. (Cl. 183—4.)

1. Apparatus for removing condensible from a gaseous mixture comprising, in combination, a mixture inlet pipe, a stripped gas delivery pipe, a pair of adsorbers each having two ports, a four way valve selectively connecting one port of each adsorber to one of said pipes, a cooler, a pair of condensate traps and means connecting a trap between the remaining port of each adsorber and the cooler.

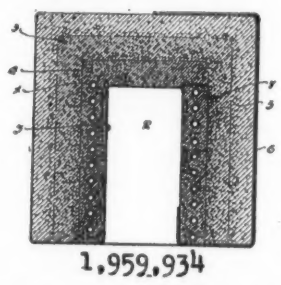
1,959,646. REFRIGERATOR. Donald E. Rutishauser, St. Louis, Mo., assignor to Hussmann-Ligonier Co., St. Louis, Mo., a corporation of Delaware. Application June 30, 1930. Serial No. 464,769. 9 Claims. (Cl. 62—89.6.)

1. A refrigerating display case including a storage compartment and a display compartment, a movable display rack separating said storage compartment and said display compartment, and refrigerating means, said display rack comprising spaced apart portions providing a passageway therebetween for air circulated through said display compartment.

1,959,681. REFRIGERATOR CAR. Otto Luhr, Chicago, Ill., assignor to Anna Eisemann, Chicago, Ill. Application April 30, 1931. Serial No. 534,010. 2 Claims. (Cl. 257—7.)

1. In a refrigerator car having a main payload compartment and a separate refrigerating chamber with ingress and egress openings therebetween for air circulation, the combination with thermostatically governed means for closing one of said openings to thereby restrain circulation of chilled air below a predetermined temperature; of means for positively circulating air within the compartment including a duct having an intake adjacent one of said openings and a fan; means for heating the air positively circulated; and thermostatic means independent of the first named thermostatic means, governing the operation of the heating means, the energy for both actuating said fan and heating said heating means being derived from and by movement of the car and the thermostatic means governing the heating means being set to cut in the heating means at a temperature below that at which the first mentioned thermostatically governed means operates to close one of said openings.

1,959,934. COOLING UNIT FOR REFRIGERATING SYSTEMS. William H.



1,959,934

Smith, Detroit, Mich., assignor to General Reduction Corp., Detroit, Mich., a corporation of Delaware. Application July 9, 1930. Serial No. 466,640. 12 Claims. (Cl. 62—95.)

2. A cooling unit for refrigerating systems having a refrigerant receiving and circulating means and walls in heat conducting relation with said means and formed of a mass of finely divided metallic particles, the density of said metallic particles varying as to certain localized portions of said cooling unit.

1,959,993. REFRIGERATING SYSTEM. Richard Whitall, New York, N. Y. Application Nov. 27, 1931. Serial No. 577,608. 11 Claims. (Cl. 62—91.5.)

1. In a refrigerating system employing a solid refrigerant, the combination with a thermal conductor in conductive association with the space or substance to be refrigerated, of means having relatively low heat conductivity as compared with said conductor for normally supporting the refrigerant from direct contact with said conductor, and means for heating said supporting means to permit movement of said refrigerant into closer heat-transferring relation with said conductor.

1,959,994. REFRIGERATING SYSTEM. Richard Whitall, New York, N. Y. Application Nov. 5, 1932. Serial No. 641,439. 13 Claims. (Cl. 62—91.5.)

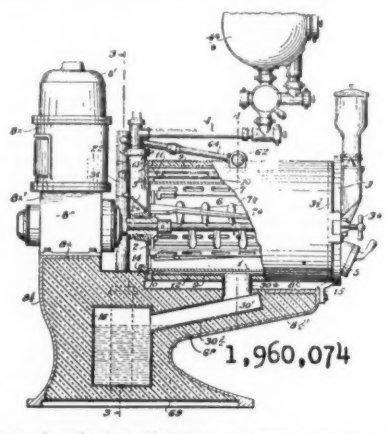
1. In a refrigerating system employing solid refrigerants, the combination with a thermal conductor arranged for exposure both to the space or material to be refrigerated and to the refrigerant, of means for supporting the refrigerant from contact with the said conductor, and means for conducting heat from a remote source to said supporting means to permit the refrigerant to contact the conductor.

1,960,040. REFRIGERATION. Nils Widell, Stockholm, Sweden, assignor, by mesne assignments, to Electrolux Servel Corp., New York, N. Y., a corporation of Delaware. Application July 8, 1931. Serial No. 549,431. In Germany July 8, 1930. 20 Claims. (Cl. 62—179.)

1, That improvement in inhibiting corrosion in an absorption refrigerating system containing liquid which consists in maintaining a reserve supply of solid liquid in a relatively still body of liquid in communication with the active portion of the system.

1,960,074. APPARATUS FOR COOLING OR FREEZING. Michael Henry Ackerman, Mansfield, Ohio, assignor to The H. H. Miller Industries Co., Canton, Ohio, a corporation of Ohio. Application Sept. 28, 1931. Serial No. 565,425. 29 Claims. (Cl. 62—11.)

1. In apparatus of the class described, the combination of a closed container, a casing surrounding said container in



1,960,074

spaced relation thereto, a reservoir for a liquid refrigerant having a relatively low boiling point arranged below said casing, an exhaust pipe for gases leading from the upper portion of said casing, a discharge conduit leading from the lower portion of said casing and connected to said reservoir, means for supplying the refrigerant from said reservoir into the space between said casing and container above the latter, and permitting the refrigerant to flow over the walls of said container, and means for shutting off the refrigerant supply means.

1,960,075. APPARATUS FOR COOLING OR FREEZING. Michael H. Ackerman, Mansfield, Ohio, assignor to The H. H. Miller Industries Co., Canton, Ohio, a corporation of Ohio. Application May 30, 1933. Serial No. 673,719. 17 Claims. (Cl. 62—114.)

1. In a heat transfer and gas separating mechanism, the combination of a casing having insulated walls and forming a combined accumulator for a volatile liquid refrigerant and a gas separator; an automatically controlled supply means for the refrigerant; an evaporator for containing materials from which heat is to be extracted supported within said casing and in spaced relation to its walls and above the normal level of the refrigerant therein; and means for circulating the refrigerant within the casing into contact with the walls of said evaporator.

Phillips Develops Unit Cooler Float Valve

CHICAGO—Recently introduced by H. A. Phillips & Co., local manufacturer of refrigeration control systems, is "No. 300" float valve, particularly adaptable to unit air coolers and flooded fin coil evaporators in which ammonia is used as the refrigerant.

The new Phillips float valve was developed for the purpose of making vital parts available without a pump down of the evaporator. Valved balance lines and separate float chambers are unnecessary, the float being placed right in the surge drum.

The "No. 300" valve has two valve seats, one for regular operation by the float and controlled by the liquid level; the second wide open at all times except when positively closed by the external valve stem.

This stem, manually operated, will close the secondary seat and makes available the cartridge which houses the primary valve parts. Ammonia in the float chamber is completely shut off from the section of the valve which carries this cartridge, and the cartridge may be removed and replaced in a very few minutes.

"You will be pleased to note that we are now supplying ARTIC to the service trade..."

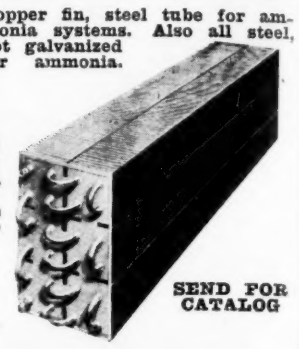
Signed:

National Ammonia Co., Inc.
Frankford, Philadelphia, Pa.
(In New England, N. Y., N. J., Pa., Del.)
Maryland Chemical Co.
Bayard and Russell Sts.
Baltimore, Md.
Matheson Co.
E. Rutherford, N. J.
Merkel Bros. & Co.
Burbank & C. L. & N. R. R.
Cincinnati, Ohio
Eaton-Clark Co.
1490 Franklin St.
Detroit, Mich.
Chemical Distributors, Inc.
365 N. Illinois St., Chicago, Ill.
Thompson-Hayward Chemical Co.
29th & Southwest Boulevard
Kansas City, Mo.
Enochs Sales Co.
813 Poydras St.
New Orleans, La.
G. S. Robins & Co.
310-316 S. Commercial St.
St. Louis, Mo.
Hunzicker Bros. Co.
105-107 E. California St.
Oklahoma City, Okla.
Denver Fire Clay Co.
P. O. Box 1107, Denver, Colo.
L. H. Butcher & Co.
274 Brannan St.
San Francisco, Cal.

Artic REG. U. S. PAT. OFF. *is the registered trade-mark name of du Pont for its Methyl Chloride especially manufactured for refrigeration purposes.*

THE "R. & H." CHEMICALS DEPT.
E. I. DU PONT DE NEMOURS & CO., Inc.
WILMINGTON, DEL.
DU PONT REG. U. S. PAT. OFF.

COMMERCIAL EVAPORATORS *by* KRAMER
are all copper, hot tin dipped. Made in 10 different fin sizes—various fin spacings—to cover any over all dimensions.
Copper fin, steel tube for ammonia systems. Also all steel, hot galvanized for ammonia.



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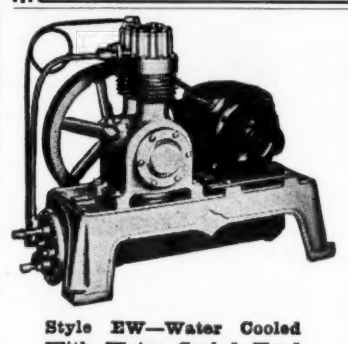
210-212 West 65th St. N.Y.C. — TRENTON N. J. — 5114 Liberty Ave. Pittsburgh, Pa.
SEND FOR CATALOG



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OUTSTANDING PERFORMANCE
attested by satisfied users — EVERYWHERE!
Sturdy Condensing Units from 80 to 2868 Lbs. I.M.E., and all other commercial refrigeration equipment—Wall type cases with machinery—A beautiful household line of modern, conservative styles—Write for full data.
THE STARR COMPANY
Cable "Starr" — Richmond, Indiana (factory) U. S. A. — Since 1907
Style EW—Water Cooled With Water Cooled Head
1344 S. Flower St., Los Angeles, Calif.

A NEW WATER VALVE
Model 71 Solenoid Valve provides dependable control of water spray nozzles on air washers. Drop forged body—heavy stamped cover, crackle finish. Easily installed, small and neat in appearance. Impact type plunger. For use with water only. Can also be supplied for the control of refrigerants. Working pressure 100 lbs. 3/32" port. Write for details.
AUTOMATIC PRODUCTS CO.
121 N. Broadway Milwaukee, Wis.

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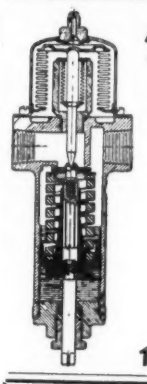
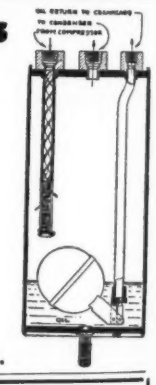
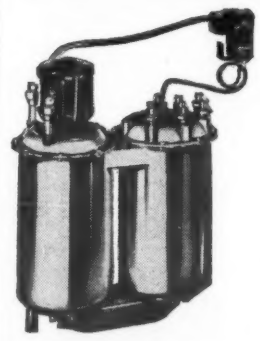
REPAIRS		REPLACEMENT PARTS	
B & B Household Controls	$2.50	Howell Special Capacitor Type ⅛ HP Refrigerator Motor	$11.00
Penn Household Controls	2.50	Amer. Rad. Household Exp. Valve	4.50
Penn Commercial Controls	4.50	Amer. Rad. Multiple Exp. Valve	7.50
Amer. Rad. Household Exp. Valve	2.50	Penn Commercial Controls	$8 & $12.00
Amer. Rad. Multiple Exp. Valve	3.50	Iso Butane (Freezol) Per lb	1.25
Apex Water Regulating Valve	3.50	Methyl Chloride, Per lb	.70
Penn Water Regulating Valve	3.50		

We also carry a complete stock of Gilmer Belts, Penn Water Regulating Valves, Glass Defrosting Trays, Lead and Fibre Gaskets, Etc. WRITE FOR PRICES.
Forty Eight Hour service on repairs, immediate shipment on replacements. All Repairs and Parts guaranteed to be free from defects in Workmanship, and Material for ONE YEAR.
REFRIGERATION SERVICE LABORATORIES, INC.
418-20 Rush Street Chicago, Illinois.



Automatic Oil Separators
PRESSURE WATER REGULATING VALVES
HIGH SIDE FLOATS — EXPANSION VALVES
LIFTERS — STRAINERS — DRIERS
HYDRON BELLOWS — LUBRICANTS
SOFT SEAT PACKLESS VALVES
AND OTHER ACCESSORIES
WRITE
RILEY ENGINEERING CORP.
1481 14th St. Detroit, Mich.





Radial Dual Control Beer Cooler
Installs in any fixture.
Uses any refrigerant.
Positive automatic temperature control gives accurate wide temperature range.
Available with 1 to 4 draft arms with capacity for all demands.
Write today for details on the "Radial" franchise for your territory.
Commercial Coil & Refrigeration Co.
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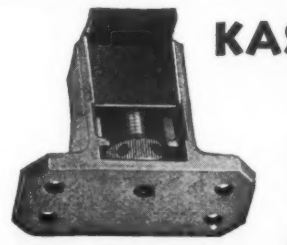

KASON'S
K-40A
Refrigerator Latch
Patented Micrometer Adjustable Strike
Permits offset adjustments to the thousandth of an inch.
Send for Literature—Samples on Approval
KASON HARDWARE CORPORATION, 61-67 Navy St., BROOKLYN, N.Y.

REFRIGERATOR PARTS FOR ALL MAKES *in Stock*
Send For Our Catalog
Dehydrated Tubing
Brass Fittings, Pins
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Temperature Controls
Expansion Valves
Condensing Units
THE HARRY ALTER CO.
1728 S. Michigan Ave. CHICAGO

Listing Over 2,000 Items

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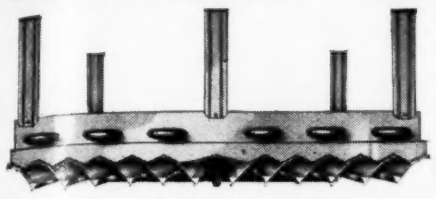


The NEW Eye Appealing Method of Cooling Walk-In Refrigerators

STYLE & RESULTS

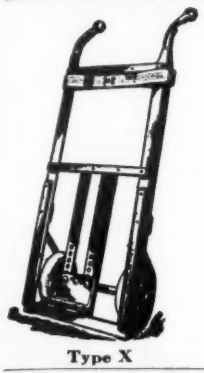
Fin Coils and Drip Pans Engineered in an Integral Unit—Saves Installation Cost and Operating Cost

PEERLESS ICE MACHINE CO. 515 W. 35th St. Chicago

DAYTON V-BELTS

● There is a Dayton V-Belt for all makes and types of refrigerators. A stock is available near you. Send for price list and name of your nearest distributor.

THE DAYTON RUBBER MFG. CO.
DAYTON, OHIO
The world's largest manufacturer of V-Belts



The Dayton CARRIER Truck

Deliver Your Refrigerators on Rubber

Type X has 53 inch Handles and 8 inch Rubber Wheels. Type Y has 70 inch Handles, 5 inch Rubber Wheels and skids.

Type X with one strap $16.00
Tpye Y with one strap $17.50
f.o.b. Dayton

International Engineering Inc.
Dayton, Ohio
15 Park Row — New York

Type X Type Y

RACK'S KOILS KOOL

THE TRADEMARK OF FOUR
PACE SETTERS
IN COIL EFFICIENCY

SUR-E-FEX — Fin Coils
FAN-E-FEX — Diffusing Units
HUM-E-FEX — Non-Dehydrating Coils
AIR-E-FEX — Air-Conditioning Units

SEND FOR NEW CATALOG DESCRIBING THESE SENSATIONAL DEVELOPMENTS

REFRIGERATION APPLIANCES, INC.
H. J. KRACKOWIZER, Pres.
1342 WEST LAKE ST., CHICAGO

You'll Keep More of Your Profit

if you use the new 1934 Model Heavy Duty X-70 Refrigerator Trucks—fit all cabinets with or without legs, or in the crate preventing damage to cabinet, floor or walls. Sturdy all steel frame. One truck with top casters and handles for tilting and rolling into delivery truck and on stairs. Only pads touch cabinet. Complete set $34.50. Ball bearing swivel casters on one end $5 extra. Also manufacturing Balance Trucks and eleven styles of piano trucks.

Self-Lifting Piano Truck Co.
Findlay, Ohio
Manufacturers of Trucks Since 1901

The 1934 Refrigeration Directory and Market Data Book

—692 pages of facts and figures, names and addresses, tabulations and charts—for manufacturing executives, distributors and dealers, sales and service men, who want to know what the industry has accomplished, nationally and locally.

The single copy price is $3.00 per copy and when purchased in combination with a new or renewal year's subscription to Electric Refrigeration News the combined price is only $5.00. Place your order today.

— Table of Contents —

Alphabetical Section
Names and addresses of all companies which sell products or services to the refrigeration industry, listed alphabetically.

Trade Name Section
Alphabetical listing of all trade names of refrigeration products or equipment identified with the product and name and address of the manufacturer.

Geographical Section
Names and addresses of manufacturers together with executive personnel, telephone number, branch offices, and products, listed by states and cities.

Classified Products Section
Products and services sold by or used by the refrigeration industry listed alphabetically in related groups with names and addresses of manufacturers.

Specifications Section
Specifications of all standard models of all makes of household and commercial refrigerators in related groups listed alphabetically by trade names.

Statistical Section
Surveys of distribution channels and merchandising activity. Air-conditioning installations. Sales of electric refrigerators and companion merchandise. U. S. Census figures, exports, surveys of wired homes and potential markets, etc.

Review Section
Development of the electric refrigeration industry—a brief summary of products and marketing methods.
A review of electric refrigeration news in 1933—an interpretative digest of important trends and events. Recent engineering progress in electric refrigeration.

Business News Publishing Co., 5229 Cass Ave., Detroit, Mich.

QUESTIONS

Manufacturers of Refrigeration Parts

No. 1643 (Manufacturer, Wisconsin)—"In connection with some development work we are doing at this time, we would like to have a list of companies manufacturing condenser, evaporator coils, and cabinets for refrigeration purposes."

Answer: See the new 1934 REFRIGERATION DIRECTORY which lists all manufacturers of parts, materials, and supplies.

To Prevent Sticking of Ice Trays

No. 1644 (Distributor, Canada)—"Some time ago an advertisement appeared in your paper about a slip grid manufactured by the Hamo Co. This device was to prevent ice trays sticking in refrigerator evaporators. Can you tell us the address of this company?"

Dimensions of Defrosting Pans

No. 1645 (Manufacturer, Indiana)—"Do your specifications contain dimensions of defrosting pans used in electric refrigerators?"

Answer: No.

Electric and Ice Refrigeration Statistics

No. 1646 (Attorney, Minnesota)—"We represent certain parties who are involved in a lawsuit which will be tried next September. One of the questions involved in that case is whether the purchase of a competing ice company violated the anti-trust laws of this state.

"One of the contentions which we have advanced in this litigation is that the sale of natural or manufactured ice is only one of the methods by which consumers are furnished with refrigeration, and that if any attempt were made to raise the price of natural or manufactured ice, the result would be to open the door to the sale of more mechanical refrigerators than are now being sold.

"We understand that you have collected data or have information showing the encoachment by mechanical refrigeration on the use of natural and manufactured ice. If you have any bulletins bearing on this question, or have collected any information showing the extent of sale of mechanical refrigeration and the corresponding reduction in the amount of natural and manufactured ice sold in the United States or in any particular section of the United States, we would like very much to receive such bulletins or such information. We would, of course, be willing to pay such expense as you may incur in sending such information to us."

Answer: The 1934 REFRIGERATION DIRECTORY AND MARKET DATA BOOK contains voluminous statistical data showing the growth in annual sales of electric refrigerators since 1920. Included also are charts showing the annual sales of refrigerating machinery such as is used by ice plants, and the annual sales of ice boxes. Ice tonnage figures are not given, but you may be able to obtain these data from Nickerson & Collins Co., 435 N. Waller St., Chicago, Ill., publishers of *Ice and Refrigeration*.

Wants Easy-Way Connection for France

No. 1647 (France)—"I am very much interested in acquiring the dealership for the ice cream freezer manufactured by the Easy-Way Co. of Chicago. This product was described in the April 25 issue of ELECTRIC REFRIGERATION NEWS. Since the article did not give this company's address, will you kindly ask these people to send me their catalog, prices and terms, and advise them that I would not be interested unless they give me exclusive rights for France. As reference, you might mention that I have been exclusive agent for Mercoid Corp. since 1929."

Answer—Your inquiry has been forwarded to Woodrow Phelan, sales manager of the Easy-Way Co., 432 Marquette Rd., Chicago, Ill.

Refrigeration Parts Supply Houses

No. 1648 (Manufacturer, Iowa)—"It is our desire to secure a mailing list of refrigeration supply dealers. The dealers we wish to contact are those operating supply houses for commercial refrigeration systems rather than those handling only household refrigerators. Does your 1934 REFRIGERATION DIRECTORY contain such a list?"

Answer: Yes, page 297 has a list of manufacturers' agents handling refrigeration equipment and jobbers of replacement parts for commercial refrigeration. Also, starting on page 291 you will find a list of the larger independent service companies.

Figuring Commercial Jobs According to Volume of Retail Business Done

No. 1649 (Dealer, Illinois)—"Can you tell me where to get information on how to figure the size of a commercial refrigerator or display case need for a grocery or meat market according to size of the store and volume of business done?"

Answer: See page 5 of the December, 1933, issue of REFRIGERATED FOOD NEWS which carries an article on this subject.

Service Information

No. 1650 (Dealer, New York)—"We are interested in literature pertaining to servicing of refrigerating equipment. Please advise if you publish anything along this line."

Answer: All available information on the service of electric refrigerators is published in the weekly issues of ELECTRIC REFRIGERATION NEWS, and we are planning to increase our volume of information on this subject (see article on page 18 of this issue). Specifications of all popular makes are also published periodically in the NEWS (see last week's issue).

Owing to the fact that most of the manufacturers issue very complete service manuals, we have never compiled a comprehensive treatise on servicing methods.

Electrolux

No. 1651 (Exporter, New York)—"We have received from our Cape Town office certain information about Electrolux British refrigerators which use neither motors nor compressors. They are based on the same principles obtaining in oil-burning refrigerators, but instead of using oil burners, heat is supplied *electrically*.

"Our Cape Town people state that this refrigerator is meeting with amazing success in South Africa, and they feel certain that there must be refrigerators based on the same principle manufactured in the United States."

Answer—Electrolux is manufactured in this country by Servel, Inc., Evansville, Ind. The great majority of Electrolux refrigerators built in this country are for operation with *gas*, although *kerosene-operated* models are now available, and for certain limited sections of this country where electricity is very low in cost, for *electric* operation.

First Electric Refrigerator

No. 1652 (Advertising agency, New York)—"Can you give us the date of the first electric refrigerator, and the sale price?"

Answer: No, we have no authentic record of the date on which the first electric refrigerator was sold and the sale price. The electric refrigerator as we know it today is not something which was born at a specific time.

Mechanically operated refrigerating systems have been in operation for a great many years, and the problem was to perfect an outfit with automatic control which would operate in an ordinary household without the continuous attention of an engineer or mechanic. Numerous so-called automatic refrigerators were put into operation, but a number of years elapsed before certain parts such as the thermostat, seal, and expansion valve were perfected to the point where they could be depended upon.

Cabinet Manufacturers

No. 1653 (Compressor manufacturer, Illinois)—"We would appreciate your furnishing us with a complete list of companies which manufacture cabinets in which electric refrigeration units can be installed."

Answer: See page 287 of the 1934 REFRIGERATION DIRECTORY.

First Four Months' Sales Figures

No. 1654 (Newspaper, Iowa)—"We have secured from your paper figures on sales of electric refrigerators in Iowa, and the total for the first two months of 1934. We are very anxious to secure sales for the months of March and April; also, if available, total sales for this period and sales by months in the state of Iowa in 1934. We have checked each issue carefully for this, but find that it has not yet been published."

Answer: Sales and production figures for March, including sales by states, were published on page 24 of the May 2 issue of the NEWS. April figures appear on page 16 of this issue.

Total sales for the first four months of the year are estimated by the Electric Refrigeration Bureau of Edison Electric Institute at 535,583. Iowa sales by months are estimated as follows: January, 431; February, 1,758; March, 2,725; and April, 4,154.

Hermetex Insulation

No. 1655 (Manufacturer, Missouri)—"In checking specifications in a recent issue of ELECTRIC REFRIGERATION NEWS, we note that 'Hermetex' insulation is being used by a large manufacturer. Can you tell us who makes this insulation?"

Answer: Detroit Paper Products Co., 5800 Domine St., Detroit, Mich.

Portable Beer Coolers

No. 1656 (Distributor, Ohio)—"Kindly advise us names of your clients who make a one-keg, mechanically cooled, portable beer-cooling outfit such as would be suitable for home or small club use."

Answer: Try the following manufacturers: Crosley Radio Corp., Cincinnati, Ohio; Fedders Mfg. Co., 57 Tonawanda St., Buffalo, N. Y.; Seeger Refrigerator Co., Arcade, Wells and Whitehall Sts., St. Paul, Minn.

Who Makes Karlberg Replacement Seals?

No. 1657 (Supply house, Washington)—"We are very anxious to secure a No. 1250 Karlberg replacement seal complete, and also one 1389 bearing plate gasket as shown in Harry Alter's latest catalog. In your new DIRECTORY, we fail to find the name of the company making this seal. If you know the manufacturer's name, will you please direct them to send us c.o.d. parcel post one each of the above and quote us in quantities, as we will probably buy a quantity for stock after examining them."

Answer: This is a new name to us. If any reader knows this manufacturer we will greatly appreciate the name and address.

Gibson

No. 1658 (Oklahoma)—"Kindly furnish me with the complete name and address of the Gibson company which, I understand, is now manufacturing a Gibson electric refrigerator."

Answer: Gibson Electric Refrigerator Corp., Greenville, Mich.

CLASSIFIED

PAYMENT in advance is required for advertising in this column.

RATES: Fifty words or less, one insertion $2.00, additional words four cents each. Three insertions $5.00, additional words ten cents each.

POSITIONS AVAILABLE

WANTED: Refrigeration engineer to sell fin coils and air conditioning units. State salary and experience. Chicago area. Box 626.

EQUIPMENT FOR SALE

FOR SALE. Bargain lot of 78 new Fedders domestic evaporators in original cartons. Type S-27, 3 tray—6 c.f. $9.39. S-32, 4 tray—6½ c.f. $10.90. Complete with trays. For SO_2 use. Reliable Refrigerator Company, 39 East 19th Street, New York, N. Y

EQUIPMENT WANTED

REFRIGERATORS WANTED. Bought for cash. Used Apartment and Household sizes. Standard makes in unlimited quantities. Continental Refrigerator Corp., 318 East 32nd Street, New York City. Telephone AShland 4 4665-6.

MISCELLANEOUS

SMALLEST ICE MACHINE manufactured. Design very new and proven. Overall height six inches. Compact, quiet, dependable, high volumetric efficiency. I. M. E. 50, 75 and 100 lbs. Low production cost. Also Water Cooler complete with unit. Weight 62 lbs. Samples available for test. Inquiries will be welcome. Our financial standing good. Box 625.

INDEPENDENT SERVICE COMPANIES

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